



OBSERVATIONS
ON THE
STRUCTURE, ŒCONOMY, AND DISEASES
OF THE
FOOT OF THE HORSE.

—*—
Entered at Stationers' Hall.

Printed by T. Gillet, Crown Court, Fleet Street.

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OF THE
STRUCTURE, ECONOMY, AND DISEASES
OF THE
FOOT OF THE HORSE

BY
J. B. COOPER, V.M.

John Royle
Manchester
1841

OBSERVATIONS
ON THE
STRUCTURE, ŒCONOMY, AND DISEASES
OF THE
FOOT OF THE HORSE,
AND
ON THE PRINCIPLES AND PRACTICE
OF
SHOEING.



BY EDWARD COLEMAN,
PROFESSOR OF THE VETERINARY COLLEGE, PRINCIPAL VETERINARY
SURGEON TO THE BRITISH CAVALRY, AND TO HIS MAJESTY'S
MOST HONORABLE BOARD OF ORDNANCE, AND HONORARY
MEMBER OF THE BOARD OF AGRICULTURE.

Homo, naturæ minifter et interpres tantum facit et intelligit, quantum de naturæ ordine, re vel
mente observaverit; nec amplius fcit aut potest. BACON. NOV. ORGAN.

—Homini quippe, in naturam nullius rei protestatem effe, præterquam motus, ut fcilicet cor-
pora naturalia aut admoveat aut amoveat. DE AUG. SCIENT.

SECOND EDITION.

London:

PRINTED FOR THE AUTHOR;

AND SOLD AT THE VETERINARY COLLEGE; AT THE FORGES, IN GROSVENOR MEWS,
BOND STREET, AND CURTAIN ROAD, FINSBURY SQUARE; ALSO BY
J. JOHNSON, ST. PAUL'S CHURCH YARD; C. DILLY,
POULTRY; AND J. COX, BOROUGH.

1798.

1871

OBSERVATIONS

ON THE

STRUCTURE OF THE

FOOT OF THE

ON THE

1871

TO
THE KING.

SIRE,

I BEG permission to lay before
your Majesty the first fruits of my labors
in the Veterinary College; an Institution
which your Majesty has condescended to
patronize with so much goodness, and
so great effect. By conferring on the
Veterinary Surgeons, employed in the
Cavalry, the rank of commissioned Offi-
cers, your Majesty has done more to
promote

promote the Veterinary Art, than otherwise could have been effected in centuries.

This single act has not only raised the Art from contempt to respectability, but already induced many medical Students, of liberal education, to devote their services to its improvement. Whatever may be thought of my very limited endeavors, permit me, Sire, to say, that your Majesty's distinguished attention to the progress and cultivation of knowledge in general, has in no one instance been more happily employed than the present; since the noblest and most valuable

luable arts, are those which embrace the widest sphere of benevolence: utility to Mankind, mercy and relief to the Brute Creation.

I have the honor to be
Your Majesty's
faithful subject and servant,

EDWARD COLEMAN.

VETERINARY COLLEGE,

May 1, 1798.

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FORGES are established in Grosvenor Mews, Bond Street, and Curtain Road, Finsbury Square, under the directions of the Author, for shoeing the Horses of Subscribers and of Non-subscribers of the Veterinary College. A Veterinary Surgeon, duly qualified, attends at each of the Forges, to see that the System recommended in this Work, is faithfully practised.

Horses' Hoofs, shod with pattern Shoes, may be had at the Veterinary College, or at either of the Forges.

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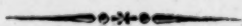
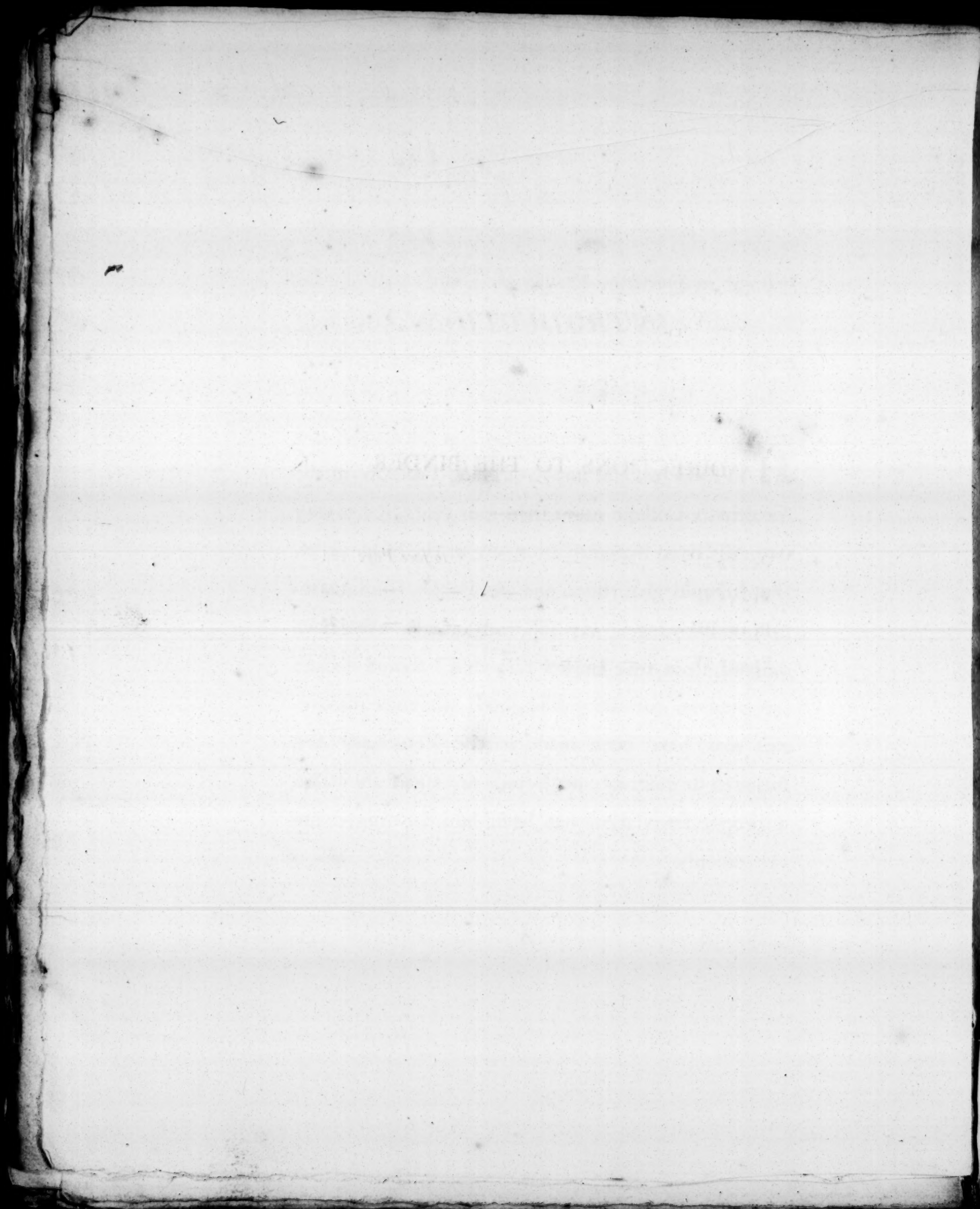


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INTRODUCTION.

HAVING had the honor of being Professor in the Veterinary College more than four years, it has very naturally been expected by many of the Subscribers, that I should give them, and the Public, the satisfaction of knowing if any solid advantages have been derived from this Institution; that I should declare and explain, for the public good, whatever discoveries may have been made in the Veterinary Art, hitherto so miserably neglected; or at least shew that a proper foundation has been laid for future improvements.

As, in this country, every branch of this Art is at present in a state of very great imperfection, my original intention was to have attempted a System of Anatomy and Physiology of the Horse, with some observations in Pathology; which, though an arduous task, I am not without hopes of yet being able to accomplish. But, as to compleat a work of this nature would require a life-time employed with industry and success, I have determined to publish, occasionally, my observations on the most essential parts of the Veterinary Art. I have preferred this plan, under the conviction that few men have either time or inclination to read a great professional book. Besides, by the selection of objects that are important, I shall discharge the duty I owe to the Public in general, and to the Subscribers of the Veterinary College in particular.

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The Art I profess to teach, I am well aware, is still in its infancy; that many opinions, formerly cherished, are now given up; and that many of our present conjectures will probably share the same fate. This must ever be expected in extensive enquiries into a new and complicated Art; but, I trust, I shall always be careful to separate opinions founded on hypotheses, from facts established by experience.

Well grounded principles are essentially necessary to improve and govern the practice of every art and science, for without these, the success of our operations must ever remain doubtful.

The practice of shoeing Horses does not appear to have undergone any material alteration in this country for centuries; yet it will not be doubted, I believe, but that this art is susceptible of great im-

provement. Those who have been employed to shoe Horses, and attend to their diseases, have never acted upon principles of any sort: nor could it be expected that men, totally destitute of all knowledge of the formation of the Horse's foot, and the uses of the different parts, should be able to cut the hoof, and apply a shoe, without destroying, or in some degree perverting, the intentions of nature. Ignorant of chemistry and the properties of medicine, unacquainted with the structure and œconomy of the animal, it was impossible for them to adopt any rational system: and without system it was not likely that the practice could ever be much improved. With greater probability of success might we employ an ignorant mechanic to supply the defects of a watch, who had never examined the situation and use of the wheels and the spring, or any part of its structure. We could not expect much advantage
from

from the labors of such a man; and yet his employment would be less intricate and difficult than that of a Farrier, who has to keep in health, or remove the diseases of a complicated machine, the internal parts of which he has probably never once seen. The artist who attends to the clock or watch, or any inanimate machine, begins to learn his art scientifically and properly. He takes the machine to pieces; he sees all the parts that enter into its composition; he learns the situation and uses of these parts, and the relative importance of each, before he attempts to remove a single impediment or defect. But the Smith is required to preserve various parts of the Horse's foot in health that he never saw, and restore them, when diseased, to their original condition, without being acquainted with their anatomy or functions.

No doubt many men of great natural talents have devoted much of their time and labor to this pursuit: but without Anatomy to teach them the formation of the foot; and without Phyfiology to indicate the uses of the parts; their principles, if they possessed any, must be fallacious or doubtful, and the success of their practice uncertain.

As no improvements have been, or were likely to be made by men laboring under these disadvantages, it must be a matter of great exultation to the original founders and supporters of the Veterinary College to be informed, that upwards of eighty Pupils have been made acquainted with proper principles, calculated to improve the practice. They have seen the parts of which the Horse is formed; they have been taught the functions of these parts; they have attended to the different diseases
incident

incident to Horses, and the remedies employed. Where these have not proved successful, the animals have been opened after death, and the diseased parts examined. We have in this manner been able to demonstrate, that the opinions formed of the diseases were justly or erroneously founded, that we could or could not have done more to preserve the life of the animal.

The Veterinary Pupils have been instructed by a very celebrated Physician, Dr. *Fordyce*, in the Materia Medica, Chemistry, and the practice of Physic. And they have heard Lectures on Human Anatomy and Physiology, and on the principles and practice of Surgery, by Dr. *Baillie*, Messrs. *Cruikshank*, *Home*, *Cooper*, and *Wilson*. The professional knowledge, of these Gentlemen is universally admitted, and above my praise. But I think it a duty to acknowledge
their

their liberality in giving their assistance and instructions to the Veterinary Pupils, without fee or reward. I ought not here to forget the debt which we owe to the memory of the late celebrated *John Hunter*, one of the first and best friends to this Institution: neither will I neglect to acknowledge the numerous advantages I have derived from the instructions of my particular friend, Mr. *Cline*; to whom I am indebted not only for any attainments I may have made in the study of Human Anatomy, but also for having directed my attention, and given me much information, on my present subject.

The improvements that can be made by any individual, must be trifling, and not worthy of national support. But the accumulated talents and industry of all the Veterinary Surgeons, directed to one object,

ject, must ultimately be attended with great and manifold discoveries.

The public have already derived some advantage from the Veterinary College, in return for the liberal grants that have been made by Parliament. Most of the regiments of regular Cavalry in England have been supplied with Veterinary Surgeons; and I believe that there is no regiment in his Majesty's service, which has had an opportunity of seeing the Veterinary Practice, opposed to the former system, that would not feel a pleasure in bearing testimony to the advantages which Government has already derived from their appointment.

The Horses of his Majesty's most honorable Board of Ordnance have been shod very successfully for two years on the plan employed in the College; and

the greater part of the British Cavalry are now shod in the same manner.

A proper mode of shoeing is certainly of more importance than the treatment of any disease, or perhaps of all the diseases incident to Horses. The foot is a part that we are particularly required to preserve in health; and if this art be judiciously employed, the foot will not be more liable to disease than any other organ. But if the principles of Shoeing are not well understood, then the practice becomes pernicious; then, instead of preventing, we are creating diseases. Now as all Horses employed require to be constantly shod, so all Horses are liable to be diseased, if the principles and practice of shoeing are erroneous; and when disease takes place, lameness is a frequent consequence.

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If, therefore, it be a fact that the common practice of shoeing engenders diseases, while the practice here recommended preserves Horses' feet in their natural state; then it will be admitted, that great benefits result to the public from its general adoption. And that the practice may be faithfully executed in the Army, a Farrier from each regiment of Cavalry has been permitted to attend the College, to learn the practical part of shoeing. This plan was thought necessary, to remove the prejudices of the Farriers, and to prevent their opposition to the principles of shoeing recommended at the College, and adopted by the Army Veterinary Surgeons.

It is notorious that the common practice of shoeing produces corns, contracted feet, and many other diseases; and it is a fact now ascertained, that these diseases may be prevented.

The intention of this Publication is to make the principles and practice of the Veterinary College more generally known. Some Gentlemen from novelty, some from partial information, and others from conviction of its utility, have employed horse-shoes very similar to those used at the College. But to the compleat success of the system, it is necessary that close attention be paid to two circumstances. It is not only requisite that the shoe should be accurately made, but the foot must be cut and prepared very differently from the common mode. Whatever shoe be employed, if parts that are essential to the œconomy of the foot are not preserved; and if the useless parts that require removal be allowed to remain, the foot must soon be in a morbid state. Where the hoof is cut improperly, the shoe must fail of success; not perhaps from any fault in the construction of the shoe, but from its application.

Nevertheless

Nevertheless it will not be found to require more mechanical dexterity to cut the hoof properly than improperly; and the best form of shoes is made with as little labor as a common shoe.

It is not my intention, in this Volume, to describe the internal anatomy or the diseases of the Horse's foot; this subject will be considered hereafter: but it will be absolutely necessary to consider the structure and œconomy of the hoof, before any rational system of shoeing can be adopted; and as one great object of the present Work is to explain the best method of preserving the hoofs of Horses by shoeing, we shall direct our observations to those points that are essentially necessary to elucidate the practice.

It would have been more consistent with the rules of anatomical demonstration, to have first described
the

the bones, the muscles, and the whole internal structure of the foot, before we examined the external covering, viz. the hoof: but as most of my readers are probably not acquainted with the internal mechanism of the Horse's foot, it seems better to begin with an explanation of the structure and functions of those parts that can be learnt with facility.

The names and situation of the crust or wall, the sole, the frog, and bars, are practically known to almost every gentleman who keeps a Horse. The formation and uses of those parts will therefore be easily understood; and when the functions of the hoof are well known, great advantages will be derived from a description of the contents; and the mind is naturally led on to a more minute investigation of the subject. But to describe in the first instance

instance the Anatomy and Physiology of parts that have not been seen, would be very apt to mislead, without giving any solid or useful information. We shall therefore reverse the common order of anatomical description, and begin with the structure and œconomy of the hoof. We shall then endeavour to prove that the common practice of shoeing alters the natural form of the hoof, and produces in it a variety of defects, while the practice here recommended preserves its structure and uses unimpaired by shoeing. This subject will form the first Volume.

The natural hoof, and the art necessary to be adopted for its preservation being considered, we shall then proceed to investigate the internal formation and œconomy of the foot. And as this organ is very complicated, it will be necessary to introduce a considerable number of Plates, to give any just
conception

conception of its formation. We shall then describe the different diseases incident to the Hoof and Foot, and suggest the remedies necessary to be employed for their removal.

OBSERVATIONS,

OBSERVATIONS,

Ec. Ec. Ec.



SECTION I.

*The natural Form, Structure and Œconomy of the
Horse's Hoof.*

BEFORE we consider the best practical mode of preserving the feet of Horses by shoeing, it will be necessary to describe the external form, the structure, and the œconomy of the hoof. Without a knowledge of the different parts of the natural hoof, we shall be liable to mistake disease for health, and health for disease.

VOL. I.

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To

To ascertain the figure and proportions of the well-formed foot, there is no more necessary than to examine the hoofs of Horses, where no shoes or art of any kind has been employed. We shall then find, that the hoofs of the fore feet are as wide from heel to heel as they are long; that is, the bottom of the hoof approaches to a circle. (*See Plate I. figure the 1st, of a Natural Hoof.*) This fact has been so little attended to, that most writers have given plates and descriptions of diseased and contracted feet, when they intended to have described a natural foot.

The common practice of shoeing has been so universally destructive, that unless the hoof be examined before it comes to the hands of the Farrier, there is no probability that it should ever be seen in its original perfect figure. From this important circumstance being overlooked, Authors have had vari-

ous

ous opinions respecting good and ill formed feet; for all of them appear to have made their observations on Horses' hoofs that had been repeatedly shod, without attempting to establish any rule or principle from nature. That rule or principle is the original form of the Horse's foot before it has been altered or perverted by art; for no doubt every animal, as well as every part of an animal, has a certain and determined structure and function, when in health, from which there can be no deviation without producing defects.

The foot of a Chinese woman, distorted and cramped by a tight shoe, would certainly not be selected by the Anatomist or Philosopher to illustrate the natural form of the human foot: nor can any form of hoof, different from the original, be otherwise than destructive to the uses of an animal

destined to support a great weight, and undergo much labor.

Those that are in the habit of examining the formation and œconomy of animals, as they advance in knowledge, are more and more convinced, that every part is made with infinite wisdom and contrivance; that each part has its particular use; and that had it been made otherwise, the purposes for which it was intended could not have been answered.

We should have no difficulty in demonstrating that a circular foot, as it comes from the hands of the Maker, is the best possible form for the Horse. No one can doubt but that a foot of this description is better adapted to support a great weight, than a sharp, oblong, contracted foot, which sinks deep into the ground at every step, and fatigues the animal.

It

It is also true, that, in proportion as the hoof is long at the toe, the Horse is liable to trip. These are the obvious inconveniences of a long contracted hoof; but as the natural hoof is created circular, any deviation from this figure produces an equal alteration of the parts contained within. The contents of the hoof are as tender as the quick or sensible parts under the nail; and can no more endure pressure without pain and inconvenience, than the human foot can bear the continuance of small tight shoes.

The cavity of the hoof is always completely filled by the foot, so that the natural hoof is perfectly equal to contain the foot, without the least pressure, but not one hair's breadth larger or smaller. No shoe can possibly be fitted with such mathematical exactness to the human foot, as the hoof is to that
of

of the Horfe. But as the cavity of our shoes cannot be diminished without pain, fo the hoof of the Horfe cannot be altered in its form, without a preffure, equally painful, on the foot, and which, with equal certainty, tends to produce difeafe. When the human foot is pinched by too fmall a fhoe, the pain is naturally removed by the fubftitution of a larger one; but the conftant fhoeing of Horfes in the common way, gradually increafes the contraction, and the animal is forced to perform great labor with a hoof that is every day producing more and more preffure on the foot.

Whatever be the ftructure and form of the natural hoof, I prefume it will be admitted, that the fole object of fhoeing is to preserve the hoof in the fame ftate. No art can improve the original circular foot Nature has made; and that practice muft be
 pernicious

pernicious and highly absurd which alters it. To ascertain whether this principle has been attended to in practice, and the foot preserved in health, we have no more to do than examine the hoofs of Horses that have been repeatedly shod. It will then be observed that nearly in proportion to the repetition of shoeing, the foot deviates from a circle, and becomes oblong. Indeed many feet, from this cause, are not one third, and some not even one fourth as wide as long. (*See Plate I. figure the 2d*) Age, however, has no effect in changing the form; for we can not only preserve Horses' feet in their natural condition, but when contracted restore them to their original figure. Nevertheless, in proportion as the common practice of shoeing has been repeated, the heels will generally be more or less contracted. An old Horse that has been shod may, therefore, be distinguished from a young one by the
feet

feet only. This contraction, which usually terminates in lameness, is not the only effect of improper shoeing; for thrushes and corns are generally produced by the same cause. It is, therefore, of great importance to ascertain the practice that occasions such effects, and the means best adapted to prevent them. But previously to this enquiry, it is necessary to describe the formation, and functions, of the crust, sole, frog, and bars.

The whole of the hoof is composed of horny fibres, without the smallest degree of sensation. The crust or wall furrounds the anterior and lateral parts of the foot. It grows obliquely from the coronet downwards, and increases in width as it descends. (*See Plate II. figure the 1st.*) The crust is the only part that can receive nails without mischief, is thicker at the toe than quarters, (*see Plate II. figure the*

the 1st.) and generally thicker at the outer than at the inner quarter. It is smooth and convex on the outside, but laminated and concave within, (*see Plate II. figure the 1st. and Plate IV. figure the 1st.*) for the purpose of being united with corresponding laminæ covering the lowest bone of the foot, called the coffin bone. This union of the crust with the coffin bone, sustains the weight of the animal. The Horse is not supported by the sole or frog; for, if these parts be removed or diseased, so as to become soft and of a fungous structure, and incapable of resistance, as in canker, the crust is, nevertheless, capable of bearing the whole of the superincumbent weight. If the sole and frog, in reality, supported the weight, then the foot would slip through the crust, when the frog and sole were taken away. But, as the crust supports the weight, even when the sole and frog are removed, there can be no

doubt but that one of the functions of the crust is to support the animal. And, as the laminæ are elastic, this furnishes as many elastic springs as there are laminæ, to prevent shake and concussion when the Horse is in action. The horny sole is united with the lower part of the crust, (*see Plate II. figure the 1st.*) and covers the inferior surface of the coffin bone: but between the horny sole and coffin bone there is a vascular substance, called the sensible or feeling sole*, and the blood vessels of this part produce the horny sole. The horny sole is concave on the outside, (*see Plate I. figure the 1st.*) beginning at the junction with the crust, and increasing as it advances towards the centre; so that the edge of the sole, united to the crust, is least concave. The sole, on its internal surface, is convex. (*See Plate II. figure the 1st.*)

* This part of the foot will be hereafter described.

The

The use of the horny sole is to protect the sensible sole from injury, to act as a stop, by embracing the ground, and when the laminated substances elongate, the horny sole at the heels descends. This action of the horny sole contributes very considerably to assist the laminæ in preventing concussion when the Horse is in motion.

The bars, or binders, as they are termed, are two in number. They are placed between the frog and sole; and, at the heels, form a broad solid junction with the crust. (*See Plate I. figure the 1st.*) The toe, or small part of the bar, sometimes reaches externally nearly as far as the toe of the frog. The bars within the hoof are laminated in the same manner as the internal part of the crust, and are attached to the horny sole. (*See Plate II. and*

Plate IV.) The insensible laminæ are intimately connected with the laminæ of the sensible sole.

The use of the external bars is to keep the heels expanded; and the internal laminæ of the bars are intended to prevent dislocation, or separation of the sensible sole, from the horny sole. In a natural hoof there are two large cavities between the frog and bars. (*See Plate I. figure the 1st.*)

The frog is an insensible body, externally convex, and placed in the centre of the sole, of a wedge-like form, pointed towards the toe, but expanded as it advances to the heels. In the centre of the broad part there is a fissure, or separation. (*See Plate I. figure the 1st.*) The frog is connected internally with another frog, of a similar figure, but different
in

in structure. The external frog is composed of soft elastic horn, and totally insensible. The internal frog is much more elastic than the horny frog; it has sensation, is connected above with a small moveable bone, (by some called the shuttle bone) and at the extremity of the heels with two elastic substances called cartilages. The toe of the sensible frog is united to the coffin bone; but more than nine tenths of both frogs are behind the coffin bone. The toe of the sensible and horny frogs, from their connection with the coffin bone, are fixed points, and have no motion; but the heels of the frogs, being placed posterior to the coffin bone, and in contact with moveable, elastic (and not fixed or resisting) substances, a very considerable lever is formed, and whenever the hoof comes in contact with the ground, the frog first ascends, and then

then descends*. The ascent of the frog expands the cartilages, preserves the heels from contraction, and affords to the Horse an elastic spring: while its wedge-like form prevents the animal from slipping whenever it embraces the ground. But, without any anatomical enquiry into its internal structure and connection with other parts, the shape and convexity of the frog clearly demonstrate that it was formed to come in contact with the ground. (*See Plate I. figure the 1st.*)

We cannot suppose that the all-wise Creator would have made an organ, much exposed to in-

* The attachment of the sensible frog to the shuttle bone and cartilages, will be described more fully hereafter, and Plates given to shew their connection, and explain their functions. But it was necessary to mention them briefly in this place, that the use of the horny frog might be the better understood.

jury,

jury, without making its structure adequate to its function. We see that animals destined for a cold climate are provided with a much warmer covering than animals in a higher temperature: we discover that the eye is admirably constructed for receiving light; the ear for the vibrations of sound; and every organ, in every animal, beautifully formed to answer its peculiar use. Shall we then doubt that the frog is made with the same degree of wisdom as other organs? Shall we not conclude that it was intended to receive pressure, since its convexity must make it liable to touch the ground at every step? The more we investigate this subject, the more we are convinced that the use of the frog is to prevent the Horse from slipping, to preserve the heels expanded, and by its motion to act as an elastic spring to the animal.

Mr.

Mr. *Saintbel*, and many others, were of opinion, that the use of the frog, is, to serve as a cushion, or guard to the tendon of the flexor muscle of the foot. Where this opinion prevails, it is very natural to conclude, that art should endeavor to raise the frog from the ground, by a thick heeled shoe, in order to guard the tendon from bruises. But, if it be a truth that this projecting body was intended to enter the ground, then it will follow, as a law of nature, *that unless the frog perform its functions, it must be diseased.*

The human legs are formed to support the weight of the body; but if they are constantly kept in a horizontal posture in a state of rest, they will soon become enfeebled and diseased. The Horse is an animal intended for active life, but if he is suffered to remain long without motion, his whole system becomes

becomes affected. Indeed, common observation clearly proves, that no animal, or any part of an animal, can be preserved in health, where the natural functions are perverted. If the real functions of the frog had been equally well understood, then it would have been thought as necessary, for the health of this organ, that it should be in contact with the ground, as we know it to be important for an active animal to have motion.

That the frog was not made to defend the tendon, can be demonstrated. There is no medical man, in the least acquainted with the structure and œconomy of tendons, but must be fully convinced, that the frogs of Horses cannot have been formed to protect the tendons from injury. It has been proved by experiment, that the substance of tendons in health has no sensation; and, consequently, that one insen-

fible body (viz. the frog) cannot have been made for the purpose of protecting an organ void of feeling. Again, the frog, being made of a wedge-like form, a great part of the tendon is not covered by the frog, and more than one half of it projects behind the tendon. If the frog had been made to act, as a cushion, to save the tendon, then its shape and magnitude would have been exactly equal to the tendons.

The practice of shoeing, very much depends on the functions of the frog being understood. If the opinions here advanced respecting its uses be well founded, then it must follow, that paring the frog, and raising it from the ground by a thick heeled shoe, annihilates its functions, and ultimately, if not immediately, produces disease: and that, applying a shoe thin at the heel, and exposing the
frog

frog to pressure, is the only proper method to keep it in health. Moreover, it has been demonstrated, from experience, that unless the frog sustain an uniform pressure, it becomes soft and inflamed, and the heels contracted: but if this organ be always in close contact with the ground, then it will be callous, insensible, and healthy, and most of the diseases incident to the foot prevented.

The same degree of pressure applied to the frog, that produces only pleasant sensation when in health, creates exquisite pain when diseased. It is therefore of great importance to preserve the frog sound, for when cut, it becomes highly susceptible of every impression: we might with as much wisdom remove the skin of the human foot, when obliged to walk on stones, without shoes.

Granite and other hard substances have no effect on the frog, when it is preserved, and the hoof properly shod: but, where it is soft and tender, in consequence of being cut, and raised by a thick heeled shoe, one stroke from a projecting stone will produce pain, while perpetual pressure, with a proper shoe, is attended with salutary effects.

Those who conceive that the frog was not made to be in contact with the ground, and with that view cut the frog, to diminish its convexity, and employ high heeled shoes for its protection; would do well to consider, whether their practice is in truth conformable to their own principles. If it be true, that no shoe, however high at the heel, applied to any hoof, can prevent the frog from occasional pressure, then it must follow that the practice and principles do not agree: and it can be demonstrated,

frated, that no frog is exempt from preffure, even if the fhoe be turned up two inches at the heels. Where the roads are covered with a convex pávement, or with loose ftones, the frog is liable to be ftruck by every ftone that exceeds the thicknefs of the fhoe: and in other fituations, where there are no ftones, the cavity of the fhoe is filled with earth, fo that the frog is frequently expofed to preffure. It therefore becomes a queftion, whether repeated blows on a part that has been cut, made foft, and very fufceptible of impreffion, will not produce more pain, and more difeafe, than conftant and uniform preffure applied to a frog in health.

Horfes wearing high heeled fhoes, when a fharp ftone comes in contact with a foft and thin frog, are frequently liable to fall. It may be imagined, that if a Horfe feels pain from the preffure of one blow,

great

great mischief must ensue, when the same cause is many times repeated; and that, in proportion as the cause is repeated, the effect, or disease, must increase. But, it has not been considered, that in consequence of always standing on the frogs (even in the stable) on hard surfaces, these organs become totally insensible, and resist even the hardest bodies without the least irritation. Nor is this fact inexplicable, or peculiar to the Horse. Do we not see that the palms of hands of smiths, and watermen, are callous, and feel no inconvenience from substances that would absolutely blister a hand, in the habit of wearing gloves? And, is it not a fact, that the sole of the human foot is equally void of feeling, when accustomed to walk without shoes?

Some writers have admitted that the frog was made to touch the ground; and yet have recommended



mended a shoe thick at the heel, which raises this organ from pressure, and destroys its functions.

Having superficially described the formation, and uses of the crust, sole, bars, and frog, I shall now proceed to examine the common method of cutting the hoof, and the form of shoe generally employed. We shall then be able to determine if that practice be incompatible with the principles here inculcated; and if it be capable of preserving the hoof in its natural form, unimpaired by shoeing. This object should be particularly kept in view; for that practice must indubitably be the best, that allows the different parts to perform their respective functions, and preserves them in their original condition.

SECTION

SECTION II.

The common Practice of shoving Horses, and its Consequences.

BEFORE any shoe be fitted to the hoof, the bars are totally, and the frog partly, removed by an instrument called the butteris. If it be true, that the bars are made to prevent the heels from contraction, or, indeed, if the bars have any function, that function must be lost when they are destroyed. Any man, in the least acquainted with the wisdom of Nature, will be convinced, that if the bars had been of no use, they would not have been created. As they are always found in a natural hoof, the conclusion is self-evident, that they are of some use :
that



that use we have attempted to demonstrate, is, to preserve the heels from contraction.

The removal of the bars is termed, opening the heels; and is performed for the express purpose, that the heels may not contract, or the heels of the shoe press upon the sole, and occasion corns. But it is rather unfortunate, that this operation, intended to prevent corns, and contracted heels, should be the remote cause of the very diseases designed to be obviated. The frog being cut, is very susceptible of injury, and incapable of acting as a stop to the animal, or performing its other functions.

When the hoof is thus prepared, a shoe is applied, thicker at the heel, than at the toe, broad in the web, having its upper surface concave, and the under surface convex, and four nails placed in each

quarter of the crust. (*See Plate II. figures the 1st and 2d.*) This is the Horse-shoe, almost universally employed in this country; and a consideration of its form, and application, will fully explain the alterations, and diseases, which take place, when the hoof is cut as here described. The heels of the shoe, being high, will prevent the frogs from embracing the ground, and the concavity of the shoe at the quarters, and the nails (that are placed near the heels) will confine the growth of the crust, and contract the hoof.

It has been already stated, that the hoof is always conical, the lower part forming the basis, and the upper part the apex of the cone; and that all the crust grows from the smallest part of the cone, viz. the coronet. As the crust is formed from the apex of the cone, and as the basis is one third wider, it
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is evident, that the crust grows obliquely, and that, when it has descended from the hair at the coronet one inch, all the crust below must descend in an equal proportion. Where no art is employed to alter the direction of the natural growth of the hoof, it will then be found, that the last inch of crust, at the basis of the cone, will be about one third wider than the apex. (*See Plate II. figure the 1st.*) But when the frog, and bars, are taken away, and the common shoe applied; the concave part of the shoe confines the lower edge of the crust in the manner of a vice, and the two, or four last nails in the quarters, produce the same effect, in kind, but greater in degree, from the very edge of the crust to the clinch of the nails. (*See Plate II. figure the 1st.*) If the shoe be nailed at the heels, the crust at this part must remain of the same diameter during the application of that shoe, unless the power and incli-

nation of the crust to grow obliquely wider, exceed the power of the nails. The crust will still continue to descend as before, at the coronet; but if the crust grow one inch from the top, the lower part descends an equal distance, and should expand obliquely. At first view, it seems difficult to explain in what manner the last inch of crust can, in the least degree, expand, when there are two fixed points with four nails, added to the concavity of the shoe on each side, that confines the lower part of the quarters to the width of the shoe. The fact is, that so great are the efforts of nature to counteract the bad effects of art, improperly applied, that the nails are absolutely bent out of their course, by the overbearing influence of the growth of the crust. The shoe, therefore, which fitted the hoof when first applied, is generally too small at the expiration of a month. It is obvious, that the diameter of the shoe
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can never alter ; but the crust descending, and expanding, becomes too wide for the shoe, and then the heels of the shoe (as the Farrier terms them) "are eating into the sole," and producing corns. The outer edge of the shoe at the heels, which was before in contact with the crust, now rests on the sole.

It has been already observed, that the sole, and frog at the heels, were formed to act as a spring ; but while the shoe is fixed, and in actual contact with the insensible sole at the heels, the descent of this organ is obstructed, and the sensible sole becomes bruised, and inflamed.

It therefore appears, that the disposition of the crust to grow down obliquely, is even greater than
the

the influence of the nails, and concavity of the quarters of the shoe, to confine the crust. Nevertheless, it is equally true that the nails, and shoe, have a powerful effect in diminishing the natural degree of expansion of the hoof; and accordingly, from their perpetual influence, and the removal of the frog, and bars, we find that the heels of almost every Horse (shod in this manner) are more or less contracted. The hoof, naturally circular, becomes altered to an oblong figure; and instead of being as wide, as long, the length of the hoof is frequently double, and sometimes treble the width. (*See Plate I. figure the 2d.*) Any shoe, however, can be employed for a time, without pain, or any obvious inconvenience. If the sensible parts are not wounded, the Horse will be found at first *with any shoe*; but ultimately, the common shoes, combined with the common

common practice of cutting the hoof, generally produce corns, thrushes, or contracted feet, and frequently all these diseases in the same foot*.

It has been affirmed, that a long hoof, is a hoof of the greatest perfection: but, to suppose that art can improve and alter for the better the natural form of the hoof, is an absurdity too great for serious refutation: and as the common practice of shoeing produces a very considerable alteration in the form, and structure of the hoof, no stronger proofs can be required of the necessity of abolishing a system that produces deformity.

Contracted hoofs are certainly not so frequent in the country as in London. In the metropolis, the

* There is scarcely a post, or coach-horse, that is free from one, or all of these diseases.

Farrier thinks it part of his duty to make the foot clean, and what he terms handsome: but, in the country, the butteris is less used, and the stables are not equally foul and hot. Farther, Horses in the country are turned out occasionally in soft ground, where the hoofs are kept cool and moist; and if the shoes are removed, Nature has a better chance to restore what art has destroyed.

Large heavy Horses are not so liable to contracted feet as light Horses, but they are very subject to a disease called canker. This malady most frequently commences in the frog, and generally proceeds from want of pressure.

As we have pointed out some of the inconveniences of the common shoe, and the baneful effects of cutting the frog and bars, we shall now proceed
to

to describe the principles, and practice of shoeing,
that have been found by experience to be capable
of preserving the form, structure, and œconomy of
the hoof, unimpaired by shoeing.

SECTION III.

The Principles, and Practice, of shoeing Horses, which preserves the Foot in Health.

THERE are two circumstances necessary to be attended to in shoeing, viz. to cut the hoof, and apply a shoe. Before the hoof is protected by iron, some parts require to be removed, and others preserved. This part of the practice is even of more importance than the form of the shoe. But, men have attended chiefly to the shoe, and not to its application, or to the hoof; and this error has produced more mischief, and more enemies to the practice of the Veterinary Collège, than all the prejudices, and calumnies, of grooms and farriers. A watch, or any other machine

machine intended to regulate time, will perform its functions, in proportion as it is well, or ill made; but a horse-shoe, may be formed mathematically correct, and yet produce lameness, if the bars and frog are removed, the heels of the shoe allowed to rest on the sole, and the frog raised from the ground. The very best shoe will produce more mischief, when applied to a hoof improperly cut, than the worst shoe, when well connected to a hoof prepared with judgment.

The first thing to be attended to, is to take away a portion of the sole, between the whole length of the bars and crust, with a drawing knife. (*See Plate III. figure the 2d.*) The heels of the sole, as has already repeatedly been observed, cannot receive the pressure of the shoe without corns. To avoid pressure, the sole should be made concave or hollow,

and not allowed to be in contact with the shoe. If there be any one part of the practice of shoeing, more important than the rest, it is this removal of the sole, between the bars, and crust. When this operation is performed, the Horse will always be free from corns, whatever may be the form of the shoe; but, if the sole is suffered to be flat at the heels, and pressed upon by the shoe, it is of very little importance what kind of shoe is applied. Every groom, and every smith, is fully convinced that the sole will not bear pressure; and to prevent this effect they remove the whole of the bars, by opening the heels, and applying a concave shoe. We have endeavoured to prove, that the destruction of the bars is always improper; that this practice is the remote cause of corns, the very disease which it is intended to prevent; and that the bars are very necessary to preserve the circular form of the

the

the hoof. Besides this, the heels of the shoe should be made to rest on the junction of the bars with the crust; (*see Plate III. figure the 2d.*) but if the bars are removed, then the shoe is supported by the crust only, and not by the solid broad basis of crust and bars united.

Any Horse may be pricked in shoeing by accident, but corns proceed from neglect. I have never seen a single instance of this disease, where the sole at this part has been concave, the bars preserved, and the shoe properly applied. It is necessary that the sole should be cut before any other part of the hoof be removed. If the heels have been first lowered by the butteris, then possibly there may not be sufficient sole left to enable a drawing knife to be applied, without reaching the sensible sole; whereas, by cutting the sole in the first instance, we can determine

termine on the propriety of lowering the heels and shortening the toe. The sole can then descend, without the motion being obstructed by the shoe, and any foreign bodies that may have been received into this cavity, are always forced out when the sole descends, without producing any mischief.

It might be expected, that the sole at this part, would be bruised by gravel and stones: but we find from experience, that the sole never suffers, when there is a cavity between the bars, and crust, for such substances to escape. When the shoe is applied, the cavity between the sole, and shoe, should be sufficiently large at every part to admit a large horse-picker, and particularly between the bars, and crust. If the sole is naturally concave, a shoe with a flat surface applied to the crust, will not touch any part of the sole; and if the sole be flat, or even convex,

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in the middle, or towards the toe, the quarters and heels of the sole will generally admit of being made concave with a drawing knife, so as not to receive any pressure from a flat shoe. I never saw a hoof, that would not admit of this operation, where the Horse had been properly shod, and the bars, and heels preserved. And it is equally true, that the sole, when flat, and in contact with the shoe, is very liable to be bruised.

If a shoe with a flat upper surface, does not leave ample space for a picker, between the sole and shoe, then it is requisite to make either the sole or the shoe concave. Where the sole appears in flakes, and thick in substance, it will be better to make the whole of the sole concave, by a drawing knife; and this operation should always be performed before the toe is shortened, or the heels lowered. When we have
made

made the sole hollow, then a shoe with a flat surface will rest only on the crust: but if the sole be flat, or convex, and thin towards the toe and middle of the hoof, so as to prevent the possibility of removing the sole at these parts to form a concavity, then it is necessary to employ a shoe sufficiently concave to avoid pressure, and to admit a picker. In this case, however, the sole at the heels and quarters, even in convex feet, will generally allow of removal with a drawing knife; and then the quarters, and heels of the shoe, may be flat. It therefore follows, that where the sole can be made concave, a shoe with a flat surface may with safety be applied; but where parts of the sole, from disease, or bad shoeing, become flat, a shoe with a concave surface is required. As the hoof is always growing, and as the shoe preserves it from friction, the toe of the crust requires to be cut once

in

in about 28 days. The more horn we can remove from this part, the sooner it will be proper to apply a shoe thin at the heels, without mischief to the muscles and tendons, and the horse will be less liable to trip.

The bars and frog should never be removed. Where there are ragged, and detached parts of the frog, it is better that they should be cut with any small knife, by the groom, than by the farrier; for if the latter is once allowed to touch the frog, the sound parts are generally destroyed. Where the frogs are not large and projecting, and the heels are higher than the frogs, then it is adviseable to lower the heels, which may be done by a rasp, or the butteris; for, in every case we are to endeavor to bring the frog in contact with the ground. We should never lose sight of this principle, that the frog

must have pressure, or be diseased. If the frog does not touch the ground, it cannot perform its use; and no organ can be preserved in health, that does not perform the functions for which it was made. Nevertheless, where the frog has been disqualified for its functions for a considerable period, and become soft, it must be accustomed to pressure by degrees. If the eyes have been deprived of light, it would be dangerous to apply the natural stimulus very suddenly. If the Horse has been long without exercise, he will be diseased, and must be brought to labor gradually: and, in like manner, the frog, and every other organ, that has been placed in an unnatural condition, will receive mischief from any sudden and violent change. If the quarters are high, and much exceed the convexity of the frog, it will be necessary to lower the heels, and endeavor to bring the frog, and heels of the shoe, on the same parallel line.

Where

Where the Horfe is required to work, and the frog foft and difeafed, it may be gradually expofed to preffure, by lowering the hoof about the tenth of an inch, every time of fhoeing, until the frog be hard, and equally prominent with the heels; or if the Horfe be not required to work, great advantages will be derived from ftanding without fhoes on hard pavement.

But, as the feet of Horfes are fo variously deformed by bad management, it will be requifite, in fhoeing, to attend to each particular kind of hoof. If any form of fhoe be indifcriminately employed for all kinds of feet, it muft frequently fail of fuccefs: but by a proper attention to the different hoofs, we can generally improve the whole foot, fo as to adopt the fhoes recommended at the Veterinary College with advantage.

After the hoof has been cut, and properly prepared, then it becomes requisite to apply a shoe, and to vary its length, breadth, and thickness, at the heel, surfaces, &c. according to the hoof. If the heels of the fore feet, are two inches and a half, or more in depth, the frog sound, and prominent, and the ground dry, then only the toe of the hoof requires to be shortened, and afterwards protected by a short shoe. (*See Plate I. figure the 1st.*) This shoe is made of the usual thickness at the toe, but gradually thinner towards the heel. A common size saddle horse shoe, may be about three-eighths of an inch thick at the toe, and one-eighth at the heel. The intention of this shoe, is to bring the frog completely into contact with pressure, to expand the heels, to prevent corns, and thrushes, and canker; and if the shoe be applied when the ground is dry, in the month of May or June, it may be continued
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the whole summer; and in warm climates, where the ground is not subject to moisture, no other protection for the hoof is requisite.

It has been supposed that stones and other hard bodies would destroy the hoof; but whenever the frog is found, and the ground free from moisture, the growth of the horn at the coronet, is always equal to the consumption of hoof below: but in the winter months, when the roads are wet, the horn will be worn more from one day's labor, than that of several weeks in summer. I have known some light Horses, whose hoofs have been sufficiently strong, to wear short shoes the whole year; but such cases are not common. Nevertheless, the short shoe can be employed on most horses with advantage in summer, where the heels are from two inches and a half, to three inches in depth, and the
frog

frog equally prominent : but, unless the hoof has been properly preserved, the heels, and frog, are generally too low to receive the short shoe. The toe of the hoof requires to be shortened as much as possible; but if the frog touches the ground, no part of the heels should be cut; and, by pursuing this practice, the heels will frequently grow sufficiently high to receive the short shoe.

In this country, we have only three, or four, dry months in the year; and therefore the short shoe can seldom be employed in winter : but in cases where this shoe has been indiscriminately, and improperly applied, I have never seen any permanent inconvenience. The sole has been worn thin, and the Horse, on pavement or gravel, in great pain; but rest for a few days, and applying a different shoe, has removed both cause, and effect.

Horses

Horses for the turf may generally wear short shoes on the fore feet, if the heels be high; as the crust of a blood horse is generally stronger, and thicker, than that of heavy Horses. But when the legs are weak, and bent at the knee, or the pastern joints very long, or the heels low, this shoe is not to be employed.

During the wet months, we protect the whole of the crust by a long shoe; and if the heels of the hoof are low, we employ the same shoe in summer*.

In winter, when the heels are too high, it is better to lower them moderately with a rasp, than to wear them down by exposure to the ground with the short shoe; as the wet may destroy more horn

* The long shoe should be made of the same thickness as the short shoe, that is, about three parts at the toe, and one part at the heel.

than

than is necessary to be removed: but it cannot be too often repeated, that the sole between the bars, and crust, should be taken out before the heels are cut. If the heels are first removed, then possibly the horn left will be insufficient to leave a proper degree of concavity between the bars, and crust. Where the Horse has been in the habit of wearing very high heeled shoes, the frog would be liable to be bruised and inflamed, and the muscles and tendons (that bend the leg) by the sudden, and improper application of a shoe, thin at the heels, stretched beyond their tone. Indeed, whether the shoe, or hoof, be the cause that elevates the frog, the same attention is required, to bring it gradually in contact with the ground; we therefore find it absolutely requisite to thin by degrees the heel of the shoe, that the frog may be accustomed to hard substances. The thickness of the last shoe, at the heel, will always furnish a proper criterion for the shoe

to



to be next employed. If only a small portion of the hoof can be taken from the toe, the heel of the new shoe should be about one-tenth of an inch thinner, than the shoe removed; and the growth of the crust will generally be equal to this diminution of iron. By reducing the heels of the shoe, in the same proportion as the hoof grows, a thin heeled shoe, may, in a few months be employed; and yet the horn being preserved at the heels, and cut at the toe, every time of shoeing, the heels (shoe and hoof together) will be as high, and frequently higher, than when the former thick heeled shoes were applied. The crust that descends at the heels, we allow to remain; but subtract an equal quantity of iron from the heels of the shoe, and as much horn as possible, from the toe of the hoof. This system should be continued, until the heels of the shoe are about one-third the thickness of the toe. There are particular

kinds of hoofs, that admit of a much more speedy change; but before these are described, it will be necessary to premise, that in proportion as the crust from the coronet to the toe increases, and the heels decrease in depth, the back sinews, and muscles, will be put upon the stretch. And the converse of this proposition must be equally true, that, as the heels are high, and the toe short, these muscles are relieved. It therefore follows, that every atom of horn, or iron, taken from the toe of the crust, or shoe, tends to relax the muscles, and tendons, at the back of the leg; and that the removal of the horn, or iron, from the heels, produces the opposite effect. If these simple facts are kept in view, there can be no difficulty in ascertaining the quantity of iron, that may be removed with safety from the heels of any shoe, without increasing the labor of the muscles and tendons.

If

If a Horse has been in the habit of wearing shoes half an inch thick at every part, and the toe of the crust can be removed half an inch, (but none taken from the heels) then, if a shoe be applied, that is three-sixths, or half an inch thick at the toe, and only one-sixth of an inch at the heels, the flexor muscles, and tendons, will not be stretched, but more relaxed than before: the relative situation of the toe, and heels, will be altered one-sixth of an inch in favor of the muscles, and tendons that bend the leg. In those cases, therefore, that admit of half an inch of horn being removed from the toe, we can at once apply a thin heeled shoe, provided that the frog be found, and parallel with the heels. If the frog should not at first be sufficiently callous to resist hard bodies, without pain, this inconvenience will be frequently removed by rest, and the constant pressure of hard

pavement. But where, from contraction of the heels, or any other cause, the frog will not bear the pressure of the ground; and if it has been nevertheless most violently, and injudiciously, exposed to stones and other hard bodies, it is only necessary to remove the *cause*; that is, take off the shoes, and the *effects* will soon cease. But where the common thick heeled shoes are employed, the morbid effects are probably not seen for many months; and then, although the cause may be removed, the effects *will still remain*. If the Horse suffer no pain during the first month, from a thin heeled shoe, it may be continued with safety, and the whole hoof will be improved; while other shoes, that elevate the frog, gradually destroy its structure, and functions, without betraying the cause of the disease, till, perhaps, it is too late for the radical cure.

Young

Young Horses, with perfect feet, that have never been shod, or Horses taken from grass, do not always admit of horn being taken from the toe; and, where only a small quantity of the toe of the crust can be removed, the heels of the shoe should not at once be made thin. If no horn can be cut from the toe of the crust, and if the heels of the shoe that are first applied, be only one-third the thickness of the toe, then the flexor muscles will be stretched, and very probably occasion temporary lameness. The same precautions, therefore, are necessary for the first shoes, as for all the shoes to be afterwards applied. If the crust can be removed at the toe, nearly in the same degree as the part is to be covered with iron, and if the frog be sound, and prominent, then a thin heeled shoe may at once be employed with success. This shoe is chiefly recommended, by the circumstance of a thin heel, being the best calculated to expose the
frog

frog to pressure. But, if the heels of the hoof are higher than the frog, then no shoe of any sort will allow the frog to be in contact with the ground. And we have repeatedly observed, that the frog cannot long be preserved in health, without pressure.

In all cases, where the frog does not embrace the ground, with a thin shoe, it is necessary to cut the heels at the bottom of the hoof; and if high heeled shoes have been at the same time employed, it will require a considerable period to restore the hoof to health, as both shoe and hoof must be lowered. The shoe may be made gradually thin, and the heels of the hoof afterwards removed; or both these alterations may be effected at the same time, provided the frog be sound, and that the absolute depth of the shoe and hoof together, is not diminished in a greater degree than the crust is shortened at the toe.

We

We have frequently remarked, that contracted feet, thrushes, and canker, generally proceed from the frog not having been permitted to sustain a constant pressure. It is farther to be observed, that, as the frog may be effectually raised from the ground, even with a thin shoe, (where the heels of the hoof are allowed to grow beyond the frog) the same consequences must ensue from this shoe, if the hoof be not properly cut, that take place from the common method of shoeing. In this case, therefore, as no possible shoe can bring the frog into contact with the ground, the heels should be gradually lowered every time of shoeing, until the heels of the shoe, and frog, are equally prominent. When the frog, and the thin heeled shoe, are placed in the same line, and when the precautions here recommended, of shortening the toe, and lowering the heels, have been attended to, then it will be found, that the frog will become
totally

totally insensible, although exposed to the hardest substances. *If the heels are not already contracted, they never can contract, so long as the frog is in contact with the ground.* Thrushes, canker, and corns, are also avoided, and in short, the whole hoof is preserved in its natural figure.

When the frog is once made to bear on the ground, and equally high with the shoe, then it will not be requisite to lower any part of the heels, until they exceed two inches in height. In this case, if the ground be dry, it will be proper to have recourse to the short shoe; and if the ground is wet, to remove a small portion of horn from the heels. If the frog be long kept from the ground, then it generally becomes soft, and the blood, that should nourish, and enlarge the frog, is consumed in the production of matter which is called a thrush. But, where the frog
receives

receives the natural pressure, there the growth is healthy, and it never becomes diseased, or consumed by friction, in a greater degree than it grows.

There are some few Horses that require to be shod a little differently from the practice recommended, although the principles of shoeing are still the same.

We generally find, that the toe of the shoe is worn out, before the heels, although the toe, when first shod, be thrice the thickness of the heel: but sometimes, although very rarely, the Horse wears the shoe nearly as much at the heels, as at the toe. In that case it will be requisite to increase the thickness of the heels; for the toe, and heel of the shoe, should be worn out nearly at the same time.

Horses that are fast trotters, and others that travel from thirty to forty miles per diem, should have stronger shoes than usual, both at the toe and heels: but still the frog should be in contact with the ground.

A shoe and nails, for a moderate sized Coach Horse, should weigh from eighteen to twenty ounces. This shoe may be about one inch wide at the toe, and three-fourths of an inch at the heel; three-sixths of an inch thick on the outside of the toe, and one-sixth on the inside. The heels of the shoe should be only one-sixth of an inch, or one-third the thickness of the toe.

A Saddle Horse shoe with nails, may weigh about twelve or fourteen ounces; wide at the toe six-eighths of an inch, but one-fourth less at the heel.

The

The toe of the shoe may be three-eighths of an inch thick on the outside; the inside of the toe and the heel one-eighth. These proportions will be found generally proper for common feet; but it must be obvious that some little variation may sometimes be requisite. If the iron be well formed, the shoes for ordinary labor should last twenty-eight days; and if any Horse wears out his shoes before twenty-eight days, the substance of the next shoes may be increased.

Horses that ~~are~~ very heavy, and employed in drays and carts, must wear more iron. The toe should, nevertheless, be three times thicker than the heels, provided this quantity is not worn out before the toe. The shoes removed will generally point out the degree of wear in a given time, and also the points that have received the most friction.

And, if the heels of the shoe should, by accident, be entirely destroyed, before the toe is worn out, or new shoes applied, no mischief can ensue.

There is no kind of Horse that will not be benefited by the frog's receiving pressure, provided the hoof is not already diseased. The length of the shoe is not less important than the breadth, and relative thickness of the heels and toe. Where the heels and frogs are two inches and a half perpendicularly high or upwards, and the ground is dry, we have recommended only the toe of the hoof to be covered with a shoe, gradually thinned from the toe to the heels. The heels of the short shoe should terminate about three-fourths of an inch (*see Plate I. figure 1.*) from the heel of the crust; but the heels of the long shoe should rest on the junction of the bars with the crust, posterior to the seat of corns.

corns. The length of the shoe commonly employed, is between both: the heels are generally opposite the seat of corns, and the length of the shoe contributes very much to produce this disease. The shoe, when first applied, is adapted to the lower part of the cone of the hoof; but, before the expiration of the month, the hoof descends, is expanded, and frequently becomes too large to fit the shoe; and then the heels of the shoe, that were at first equal with the crust, press upon the horny sole, bruise and inflame the sensible sole, and occasion corns. This circumstance, therefore, explains the cause of corns not generally appearing immediately, but after the shoe has been some time applied. The short shoes are not allowed to approach the seat of corns; and then the heels of the sole having great freedom of motion, this disease is prevented. And where the long shoes are properly employed,

employed, if the heels rest on the junction of the bars with the crust, and if the sole, between the bars and the crust, is removed, corns are equally avoided.

As it has been recommended at the Veterinary College, to thin the heels of the shoe gradually, many have adopted the same principle in shortening the shoe: but we have attempted to demonstrate that the shoe should either rest on the junction of the bars with the crust, or be short of the seat of corns about three-fourths of an inch; and that the intermediate length will be liable to produce lameness.

The external and internal surfaces of the shoe should also be considered. This forms a very important part of shoeing. It may be necessary to repeat,

repeat, that the common shoe of this country is concave on the inside, beginning at the outer, and ending at the inner edge of the shoe, and convex on the outside, not very unlike the form of an oyster shell. The internal surface of the shoe is made concave, to avoid corns. But the quarters of this shoe produce the very disease they were intended to prevent, confine the heels of the hoof, and prevent their expansion. The external surface of the shoe is made convex merely to prevent labor. As it was deemed necessary to make the internal surface concave, the external part of the shoe was made convex. It would have required more time, and more expence, to make the external surface flat, and the internal concave. The same stroke of the hammer that renders a flat surface concave, will make the opposite part convex.

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I cannot induce myself to believe, that any man would prefer, as a matter of choice, a convex surface to support a great weight, constantly in motion; and particularly when the streets and roads are also covered with convex substances. It is obvious, to demonstration, that when two convex surfaces approach each other, only few points can come into contact. Mr. *Clark*, of Edinburgh, with propriety observes, that a walnut-shell, fastened to the foot of a cat, is nearly as well adapted to keep that animal firm upon its legs, as convex shoes applied to the feet of Horses.

The shoe that has been most recommended, is partly flat, and in part concave, on its upper surface. (*See Plate IV. figure the 2d.*) The flat portion of the shoe is intended to rest only on the crust, while the concavity of the shoe is supposed
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to be opposite the sole, and the nails are placed in the centre of the seat, or flat part of the shoe. The principle of this shoe, is, to prevent any part of the sole from receiving pressure, and to oblige the crust to support the whole weight of the animal. Before we examine the merits, or demerits, of this principle, it will be proper to enquire, whether in fact the practice conforms to the principle.

If it should be found, where the shoe is applied, that the sole very frequently receives pressure, then we shall certainly demonstrate, that the practice is incompatible with the principle. If it be good practice for the sole to receive pressure, then the principle must be erroneous, that attempts to make the shoe rest totally on the crust: and if the principle be well founded, for the crust only to support the shoe, then, if the sole be in contact with the shoe, the

practice must be imperfect. Except a model be taken of every Horse's foot, it is impossible for the resting place of the shoe precisely to fit the crust; for the crust not only varies exceedingly in different Horses, but in the same hoof, at different parts. (*See Plate II. figure the 1st.*) The flat surface, therefore, that is only broad enough for the toe, is frequently too broad for the quarters and heels. And in all the shoes I have ever seen of this description, the flat part of the shoe is made of the same breadth at the quarters, as at the toe. It is farther to be observed, that this surface very generally exceeds the crust at every part. In the same proportion as the seat of the shoe exceeds the breadth of crust, exactly so much of a flat surface is opposite an equal quantity of sole. The principle of this shoe is thereby defeated by the practice; for instead of the seat resting on the crust, it projects over the edge of the sole.

It

It is therefore a fact, that while great pains have been taken to make a flat seat on the shoe, in order to support the crust only, and the web concave, in order to remove pressure from every part of the sole; that the seat has, nevertheless, very rarely fitted the crust, and consequently the soles of all flat feet at their connection with the crust, must receive more or less of pressure from the seat of the shoe. Where the sole is concave, this shoe will only rest on the crust; but a shoe that is flat on its whole internal surface, would answer the same purpose: for the concave part of the sole, opposite to the concavity of the web of the shoe, would receive no pressure even from a shoe wholly flat.

It has always been admitted, that the pressure of the shoe on the sole, is productive of mischief; and from the fact being well established, this shoe has

been invented to preserve the sole. We perfectly agree with the principle, that the sole should not receive any pressure from the shoe; but, as hoofs, with thin crusts, have flat soles, the shoe that has nails in the centre of a flat seat, (*see Plate IV. figure the 2d.*) must, in all cases where the seat of the shoe is broader than the crust, press upon the sole, and produce the very effect which is intended to be obviated.

As it is a fact known to all Farriers, that the sole will not bear the pressure of the shoe without injury; the common shoe is made concave within, for the purpose of preserving the sole. But we have endeavoured to prove, that this shoe does not answer the purpose; that the sole is frequently bruised by the heels of the shoe; and, moreover, that the concavity of the quarters of the shoe confines the hoof, and produces

produces contraction. Both these kinds of shoes, therefore, occasionally press upon the sole, and are not well calculated to rest exclusively on the crust. Nevertheless, by cutting the sole properly, we find it very practicable to apply a shoe that will not press upon the sole, or produce the inconvenience of the common concave shoe, viz. that of confining the quarters.

It has been before observed, that, where the sole is removed, and made concave between the whole length of the bars and crust, a flat surface cannot touch, much less press upon the sole at this part. If the whole of the sole be sufficiently thick to admit of being concave, then the whole internal surface of the shoe may be made flat. But where the sole, towards the toe, is convex, or flat and very thin, a shoe altogether flat, or a flat seat, with the nails in the

the middle, cannot be applied, without improper pressure. The toe of the sole, in this kind of hoof, is very generally more flat, and less thick, than the quarters, and heels, and cannot be made concave. But I have scarcely ever seen an instance, where the sole could not be removed, the first or second time of shoeing, between the whole of the bars and crust.

The shoe that we invariably apply to flat soles, will be found consistent with the principle that has been so repeatedly enforced, namely, that of resting only on the crust, preventing corns, and allowing the quarters to expand. The form of this shoe is concave at its upper part, opposite to the flat or convex portion of the sole, with a narrow surface, only equal to the crust and nails; but at the quarters, and heels, where the sole can be made concave,



cave, there it is necessary to employ a flat surface. It therefore follows, that if the sole at any part be necessarily flat, there the shoe opposite to the sole must be concave, and the seat for the crust no wider than the nails: but where the sole can be made concave, a flat shoe may be applied; and as the sole, at quarters, can be preserved concave, so the quarter of the shoe may be flat. The concavity of the upper surface of the shoe attached to the toe of the crust, has no influence whatever in producing contraction of the heels; but where the lower edges of the crust at the quarters are confined between two fixed points, there contraction must ensue. If the bars and sole at the heels have been destroyed by the Farrier, so as to prevent the possibility of making a concavity between the bars and the crust, and if the Horse be obliged to work, then it will be necessary to employ a bar shoe, to rest on the frog, and raised from the sole

sole at the heels. But where the sole can be preserved only for a few weeks, it will grow sufficiently to be made concave with a drawing knife between the bars and crust; and then the heels of the shoe may be flat, without touching the sole.

Mr. *Saintbel* employed a shoe with a flat upper surface; but, from not attending to the very important operation of removing the sole under the heels of the shoe, and the indiscriminate application of a flat surface at every part of the shoe, to every kind of hoof, it frequently failed of success.

The best form for the external surface of the shoe, is a regular concavity; that is, the common shoe reversed. This shoe leaves the hoof of the same figure when shod, as before its application. And it is evident, that a concavity has more points of contact

tact with pavement and other convex bodies, than a flat or convex surface, and that the Horse is consequently more secure on his legs. A shoe that is flat externally, may preserve the hoof equally well in health; but this form is not so well calculated to prevent the Horse from slipping as a concavity.

We have already observed, that when Horses are shod in the usual manner, four nails are placed in each quarter of the crust, nearly opposite; and that this practice confines the growth of crust, and contracts the heels. To obviate this defect, the shoe should be nailed all round the toe of the crust. The toe is by much the thickest part of the crust in the fore hoofs*, and therefore capable of receiving nails, with less danger of wounding the sensible parts

* In the hind feet, the quarters and toe are nearly of the same substance.

within, than at the quarters, where the crust is generally thin: and, by preserving the greater part of the quarters free from nails, the heels are allowed to expand. If, however, the whole quarters, and heels of the shoe have no nails, the great length of lever from the last nail to the extremity of the heel, will be very liable to displace the nails, and to occasion the loss of the shoe.

About one inch and half of the heels of the shoe may be generally left without nails: but for hunting, it is requisite to place one more nail on the outside quarter. The outside is thicker than the inside crust; and if the nails are kept from the heel on the inside, the quarters of the hoof will not be confined; but, where the crust is thin or broken, this length of shoe, without nails, would be too long. It is a great inconvenience to lose a shoe at any time, but particularly

particularly so in the field; and as hunters are liable to be in deep and stiff ground, they require the shoes to be more firmly connected with the crust, than Horses used to pavement, or a turnpike road. As this practice of nailing at the toe prevents the nails from forming two opposite fixed points, and permits the crust to expand, it should be always adopted.

The nail holes, and the nails, employed at the College, are made very differently from those in common use. The nail holes are stamped with a punch of a wedge-like form, (*see Plate IV. figure 4.*) and the heads of the nails are of the same figure, namely, conical, (*see Plate IV. figure 5.*) and received into the nail holes; and then, so long as the shoe remains, so long there are heads to the nails.

This kind of nail is the invention of Mr. *Spencer*, a very ingenious Horse Nail Maker; and although the quality of the iron, and the form of the nail, render this article infinitely superior, not only in shape, but durability, yet the price is not more than seven pence per thousand above the common nails. And, from the experience I have had of their utility, I am persuaded that the shoes are not only more securely attached to the hoof, but that the Smith will find it very oeconomical to use them universally in his practice. But, if the increase of expence were an object of consideration, it is of much more consequence not to lose a shoe, and particularly in hunting*.

* These nails are sold in London, in any quantity, at No. 7, in the Cloisters, near Bartholomew Hospital.

The head of the common nail is not conical, but nearly square; and no part is received into the nail hole. When the nail is driven into the shoe up to the head, the Farrier generally continues to hammer with great violence; and, as the nail hole cannot admit the head, the texture of the nail, contiguous to the head, is shivered, and in a few days is broken: whereas the head of Mr. *Spencer's* nail operates as a wedge: the more it is hammered, the more firmly it is connected with the nail hole, so as to become part of the shoe. Moreover, the head of the common nail, when not injured by the Farrier, projects beyond the shoe, and when worn out, the shoe is liable to come off. This accident will more frequently happen, if the nails are placed in the old nail holes of the crust: before the nail holes of the shoe are stamped, the Farrier should examine the situation of the former nails; and by having new
crust

crust for the nails, the shoe will be more firmly connected with the hoof.

Horses that are employed in the shafts of heavy carriages, require an artificial stop for the hind feet, and, in hilly situations, for the fore feet. But where the frogs are sound and prominent, and the Horse not employed to resist more than his natural weight, (if there be no ice on the ground) artificial stops are useless.

It is of great importance for the frogs of the hind feet to be as much in contact with the ground as possible. Where the heels of the crust are not kept low, and the horny frog prevented from receiving its due degree of pressure, Horses are very subject to violent inflammations, and suppurations of the sensible frog, and canker extending even to the sole.

At

At Woolwich, where I have had the honor to see this practice particularly attended to, we have had no such disease; although I have seen numbers of the same kind of Horse incurably diseased with canker, from the common practice of shoeing. This practice, is, to cut the frog, leave the heels of the crust very high, and turn up the outside heel of the shoe only. The frog then becomes soft and diseased; and the internal part of the extremity necessarily supports so much weight, as frequently to occasion splents and spavins.

It is very obvious, that the raising one side of the shoe, and depressing the other, is unnatural, and must require the inside quarter of the hoof to bear more than its due proportion of weight. To remedy this defect, some Farriers turn up both heels of the shoe: but this practice is very often productive

tive of still greater mischief; for the projection of the shoe on the inside, bruises the soft parts above the hoof of the opposite hind leg, and a sinus very soon forms between the hoof and soft parts, called by Farriers, a Quittor.

The shoe employed at the Veterinary College, prevents both diseases. We turn up the outer heel of the shoe only: but, in order to guard against unequal pressure, the horn of the outer quarter is cut away, while the internal part is preserved. Where the hoof is sufficiently thick to admit of removal on the outside heel, in the same proportion as we raise the heel of the shoe, then the weight of the animal, on stones and hard ground, is mutually supported; and on soft ground, the heels of both quarters of the shoe will be nearly equal.

Where

Where the horn does not admit of sufficient removal at the outer quarter, the thickness of the shoe should be increased until the heels of both shoes are placed in the same parallel. This kind of shoe we employ on the hind feet of Horses for hunting; and in hilly countries, where the heels of the fore feet are low, the frogs small, and pastern joints long, it is necessary to apply the same kind of shoe on the fore feet. But an artificial stop for the hind feet will frequently answer every purpose. Horses that are heavy, and not liable to over-reach, and that require an artificial stop on the fore feet, for frost, may, if the heels require to be lowered, have a bar shoe; (*see Plate IV. figure the 3d.*) but whenever this shoe is applied, the middle and upper part of the bar should always be in contact with the frog, and the opposite part of the bar turned up so as to embrace the ground. When this bar shoe is ap-

plied, the frog receives pressure, and this is the great advantage of the bar. The common bar shoe is applied purposely to guard the frog from pressure; but, if the bar cannot be made to rest on the frog, it is productive of mischief. The nails of this shoe should be carried nearer the quarter, on the outside, than the common shoe, or it will be liable to become loose, and detached from the hoof. Where the frog is small, but sound, and the heels high, and obliged to be removed considerably, to bring that organ in contact with the ground, then a bar shoe is very advantageous.

A thin heeled shoe would equally expose the frog to pressure; but then the flexor muscles, and tendons, would be stretched and injured, if the heels of the hoof were suddenly lowered, and a thin heeled shoe at the same time applied.

It

It has been before observed, that one method to remedy this defect, and to bring the frog into contact with pressure, without mischief to the muscles, and tendons, is, to thin the shoe and cut the heels of the hoof gradually. But, where the frog is capable of sustaining immediate pressure, the bar shoe may with great advantage be applied, without any additional exertion to the muscles, and tendons; and the bar being made to rest on the frog, keeps the heels expanded. This shoe may also be employed for land cracks. The quarter of the hoof opposite the crack should be removed, so as not to receive any pressure from the shoe; but the frog must be in contact with the bar.

Horses are very liable to strike one leg with the opposite hoof; this accident is termed cutting. The part most frequently bruised, is, the side of the fet-

lock joint. Where the toe of the hoof is turned out, the inner quarters of the shoe or hoof are more frequently the parts that do the mischief: but when the toe is turned in, the injury is done by the anterior part of the shoe.

If the toe is turned out, the inner quarter of the crust is most frequently lower than the outer. This condition of the hoof necessarily inclines the fetlock joint of the foot that supports the weight, nearer to the foot in motion.

Farriers generally attend to the hoof that cuts, and not to the hoof of the injured leg: but while the leg is in the air, no shoe can alter its direction; and the small quantity of horn, or iron, that can be removed from the hoof and shoe, very rarely prevents cutting. But it is very practicable to alter
the

the position of the leg, that supports the animal; and thus the foot in motion may pursue the same direction without being liable to cut. The outer quarter of the crust should be lowered, and the inner quarter preserved. This operation will tend to make the bottom of the hoof the reverse of its former state, that is, the inside quarter higher than the outside, and this will throw the fetlock joints farther from each other.

Where the sole is thin, very little of the crust can be removed from the outside; and then it will be necessary to attend to the shoe. The inner quarter should be thickened, and the outer quarter made thin; which will produce the same effect, as altering the horn; or, if the hoof be sufficiently strong, both these remedies may be employed at the same time.

This

This mode of shoeing will also succeed, where the Horse cuts below the knee, called the speedy cut. But, if the toes of the hoof are turned in, then it will be frequently found, that the outside quarters are the lowest: when this occurs, we must pursue the opposite practice. The inner quarter of the hoof only should be lowered, and the outer quarter of the shoe made thicker than the inner.

By pursuing the system we have recommended, the natural form of the hoof may be preserved, and free from corns, contracted feet, thrushes, and canker.

CONCLU-

CONCLUSION.

FROM what has been observed, it appears—

1. That the natural form of the fore feet of Horses, before any art has been employed, approaches to a circle; and,

2. That the internal cavity of the hoof, when circular, is compleatly filled by the sensible parts of the foot.

3. That the hoof is composed of horny insensible fibres, that take the names of crust, sole, bars, and frog.

4. That

4. That the crust is united with the last bone of the foot, by a number of laminated, elastic substances.

5. That the uses of the laminæ are, to support the weight of the animal, and, from their elasticity, to prevent concussion.

6. That the horny sole is externally concave, internally convex, and united by its edge with the inferior part of the crust.

7. That the uses of the horny sole are, to act as a spring, by descending at the heels; to preserve the sensible sole from pressure, and (with its concavity) to form a convexity of the earth.

8. That the external bars are nothing more than a continuation of the crust, forming angles at the heels.

9. That

9. That the internal bars are a continuation of the laminæ of the crust, attached to the horny sole at the heels, within the hoof; and that these insensible laminæ are intimately united with sensible laminated bars, connected with the sensible sole.

10. That the use of the external bars, is to preserve the heels expanded; and the use of the internal horny bars, to prevent separation, and dislocation of the horny sole from the sensible sole.

11. That the external frog is convex, and of an insensible, horny, elastic nature.

12. That the internal sensible frog, is of the same form, very highly elastic, and united with two elastic cartilages.

13. That the frogs are not made to protect the tendon, as Mr. *Saintbel*, and other writers, have supposed.

14. That the use of the frog, is to prevent the Horse from slipping, by its convexity embracing the ground, and from the elasticity of the sensible, and horny frogs, they act as a spring to the animal, and keep expanded the heels.

15. That the common practice of shoeing, is, to cut the frog, and totally remove the bars.

16. That the removal of the bars and frog, deprives these organs of their natural function.

17. That the shoe commonly employed, is thicker at the heel than at the toe.

18. That

18. That this shoe is convex externally, concave internally, and four nails placed in each quarter of the crust.

19. That the shoes, being nailed at the heels, confine the quarters of the crust, and produce contraction.

20. That the frog being raised from the ground by a thick heeled shoe, becomes soft, and very susceptible of injury.

21. That the shoe being thick at the heel, only preserves the frog from pressure in the stable, and on smooth surfaces, while sharp and projecting stones are perpetually liable to strike the frog at every step.

P 2

22. That

22. That the frog being soft, becomes inflamed whenever it meets with pressure from hard bodies.

23. That the concavity of the shoe within, tends to prevent the expansion of the quarters, and to bruise the heels of the sole.

24. That the convexity without, is making the Horse very liable to slip.

25. That contracted hoofs, corns, and frequently thrushes and canker, are to be attributed to this practice.

26. That the intention of shoeing, is to preserve the hoof sound, and of the same form and structure as Nature made it; and as the common practice is
altering



altering its form, and producing disease, there can be no doubt, but, that the common practice of shoeing is imperfect, and requires alteration and improvement.

27. That it is very practicable to preserve the hoof circular, and free from corns, contraction, thrushes, and canker.

28. That to accomplish this very desirable object, it is necessary, in all cases, first to endeavor to remove a portion of the sole, between the whole length of the bars and crust.

29. That the sole should be made concave at the toe, with a drawing knife, in all cases where the horn is sufficiently thick to admit of such removal.

30. That

30. That the internal surface of the shoe may be flat, whenever the whole of the sole is concave, and will admit of a picker between a flat shoe and the sole.

31. That when the anterior portion of the sole is thin, or flat, or convex, and cannot be made concave, the shoe at this part should be made concave.

32. That as the crust, in flat feet, is always thin, the shoe at the toe should have a very small seat, only equal to the nails.

33. That as the sole, at the quarters, even in flat, or convex hoofs, will very generally admit of removal, the quarters and heels of the shoe should be flat.

34. That while the quarters, and heels, of the shoe, on the upper surface, are flat, the concavity
of

III

of the shoe at the toe has no kind of influence, in contracting the heels.

35. That the external surface of the shoe should be regularly concave, to correspond to the form of the sole, and crust, before the Horse is shod.

36. That this external concavity of the shoe, is well calculated to embrace the ground, and to prevent the Horse from slipping.

37. That the relative thickness of the shoe, at the toe and heel, should be particularly attended to.

38. That the wear of the shoe, at the toe of the fore feet, is generally three times greater than the consumption of iron at the heels.

39. That

39. That the heels of the shoe should be about one-third the substance of the toe.

40. That this form of shoe is preferred to a high heel, as it allows the frog to perform its function, by embracing the ground, and acting as a spring.

41. That the weight of the shoe being diminished at the heel, the labor of the muscles, that bend and extend the leg, is diminished.

42. That where no part of the crust can be removed from the toe, and the Horse has been in the habit of wearing high shoes, the heels should be made only one-tenth of an inch, every time of shoeing, thinner than the shoes remove.

43. That

43. That if the frog be callous and found, and the toe admits of being shortened, the iron may be diminished at the heels, in the same proportion as the toe is shortened.

44. That the muscles and tendons will be exerted beyond their tone, if the heels of the shoe are not gradually thinned as the horn grows, or as the toe of the crust can be removed.

45. That young Horses, with perfect feet, should not have thin heeled shoes at first, unless the crust at the toe, can be removed in the same degree as the iron at the toe exceeds the heels.

46. That where half an inch of horn can be taken from the toe of the crust, a shoe thin at the heel

may be at once applied without any injury to the muscles and tendons.

47. That where the heels exceed two inches in depth, and the frog equally prominent, and the ground dry, a short shoe, thin at the heels, may be applied.

48. That the heels of this shoe should not reach the seat of corn, between the bars and crust.

49. That in warm climates, and in this country in summer, the wear of the horn exposed to the ground, will not be greater than the growth from the coronet.

50. That where the heels are more than two inches high, and the ground wet, it is better to
lower

lower the heels by the butteris, than to wear them down by friction with the ground.

51. That it is not safe to employ the short shoe on wet ground, except in blood Horses with very thick crusts, and then only with great attention to the consumption of horn.

52. That the long thin heeled shoe should rest on the solid junction of the bars with the crust.

53. That the nails should be carried all round the toe of the crust.

54. That the nails should be kept as far as possible from the heels, and particularly in the inside quarter.

Q 2

55. That

55. That where the crust is thin, the nail holes of the new shoe should not be made opposite, but between the old nail holes of the crust.

56. That the nail hole should be made with a punch, of a wedge-like form, so as to admit the whole head of the nail into the shoe.

57. That the head of the nail should be conical, to correspond with the nail hole.

58. That the shoe and nails of a common sized coach Horse may weigh about eighteen ounces.

59. That the shoe and nails of a saddle Horse may weigh twelve ounces.

60. That

60. That the shoe should remain on the hoof about twenty-eight days; but if it wears out before this period, the next shoes should be made thicker.

61. That Horses employed in hunting, in frost, and in the shafts of carriages, require an artificial stop on the hind feet, and in some situations on the fore feet.

62. That whenever this shoe is employed, it should be turned up on the outside heel, and the horn of the same heel lowered.

63. That the horn on the inside heel should be preserved, and the heel of the shoe more or less thick, in proportion to the horn removed on the outside heel.

64. That

64. That this shoe, when applied, is generally as high on the inside, as on the outside heel.

65. That a bar shoe is very beneficial where the frog is hard and found, and where the heels have been much removed, to bring the frog in contact with pressure.

66. That the upper part of the bar should rest on the frog, and the part opposite the ground turned up, in order to act as a stop.

67. That when this shoe is applied, the frog receives pressure, the heels will be expanded, and the muscles and tendons not more stretched than before the heels were lowered.

68. That

68. That this shoe may be applied for sand cracks, but no part of it should be supported by the crust opposite the crack.

69. That where, from bad shoeing, the bars are removed, and corns are produced, a bar shoe may be employed, to prevent pressure opposite to the seat of corn.

70. That where the sole is too thin at the heels to admit of any removal with a drawing knife, the bar shoe may be applied with advantage.

71. That in this case the heels of the shoe should be raised from the heels of the crust, and the bar rest on the frog.

72. That

72. That the hoof being cut, and a shoe applied, as we have directed, will preserve the hoof in its circular form, and free from contraction, corns, thrushes, and canker.

EXPLANA-

Photo. I

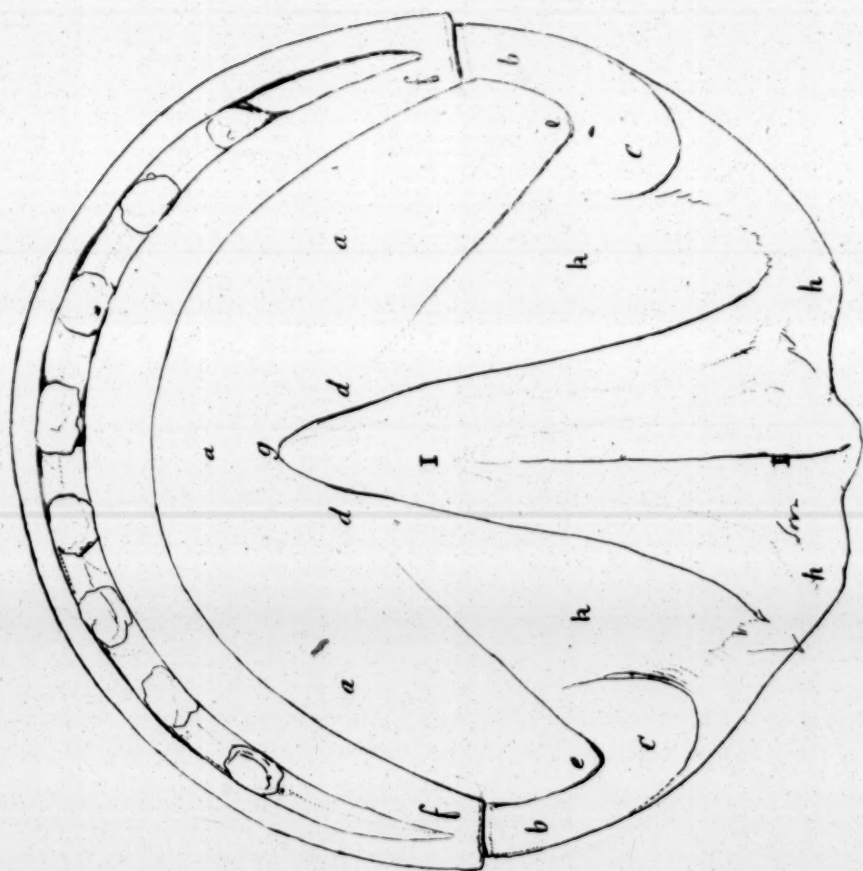


Fig. 1

Fig. II

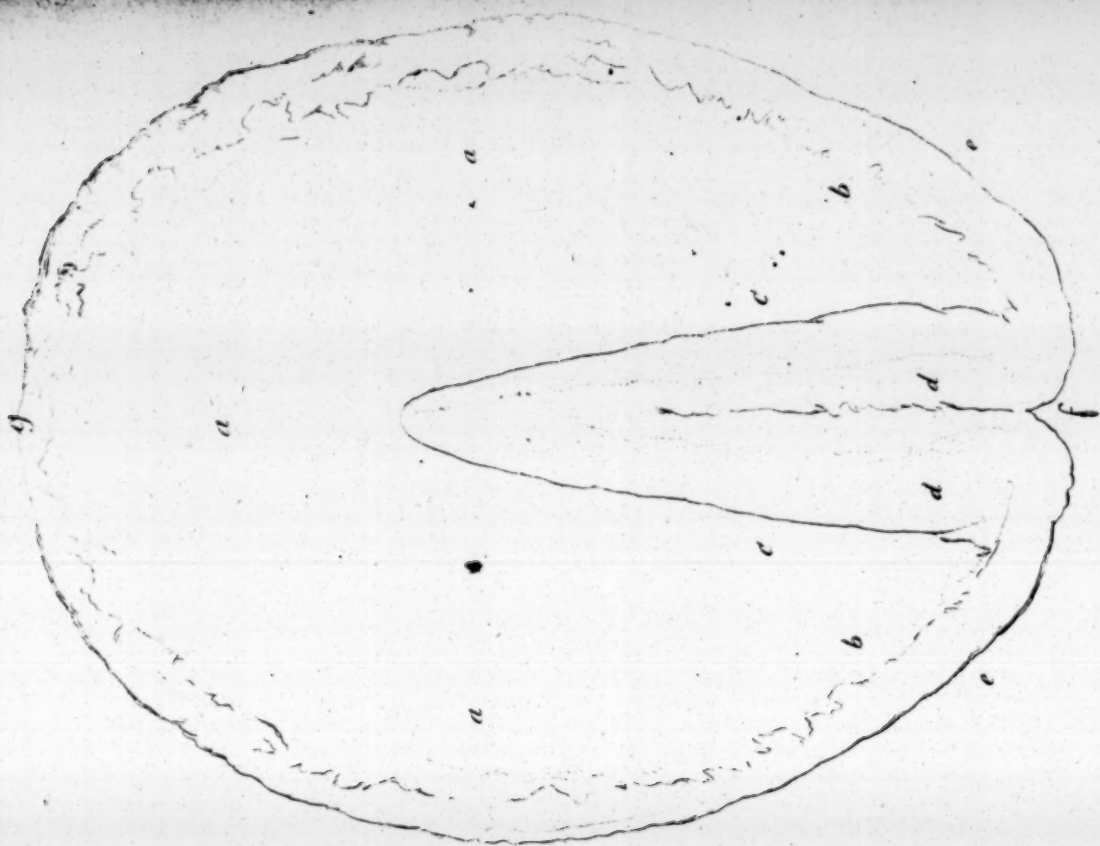
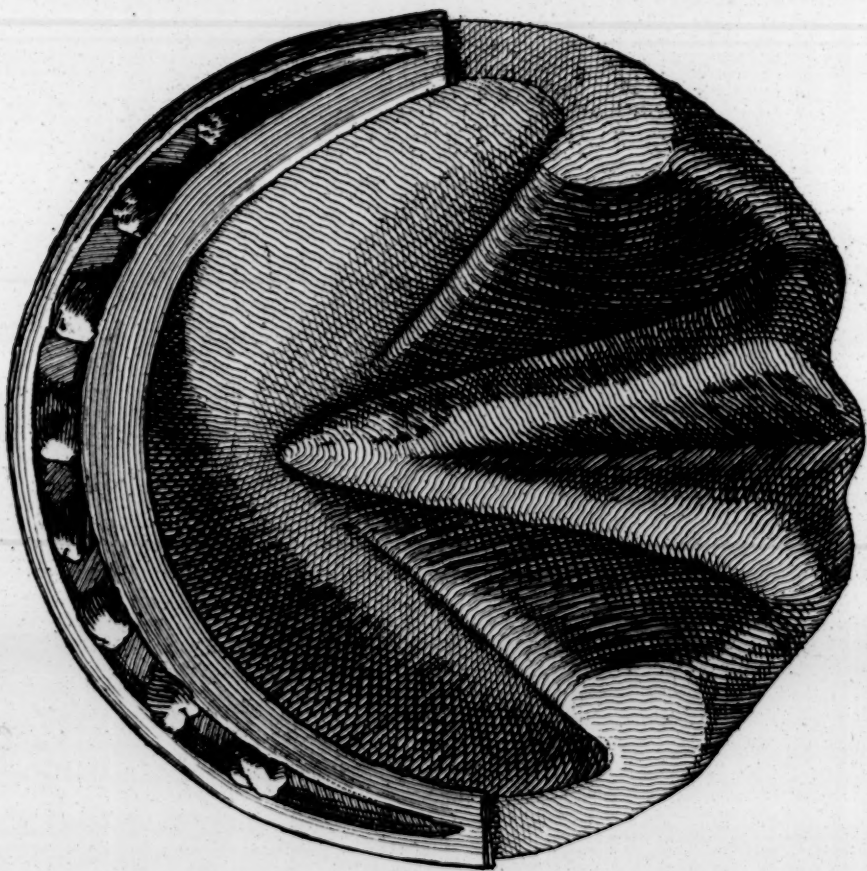
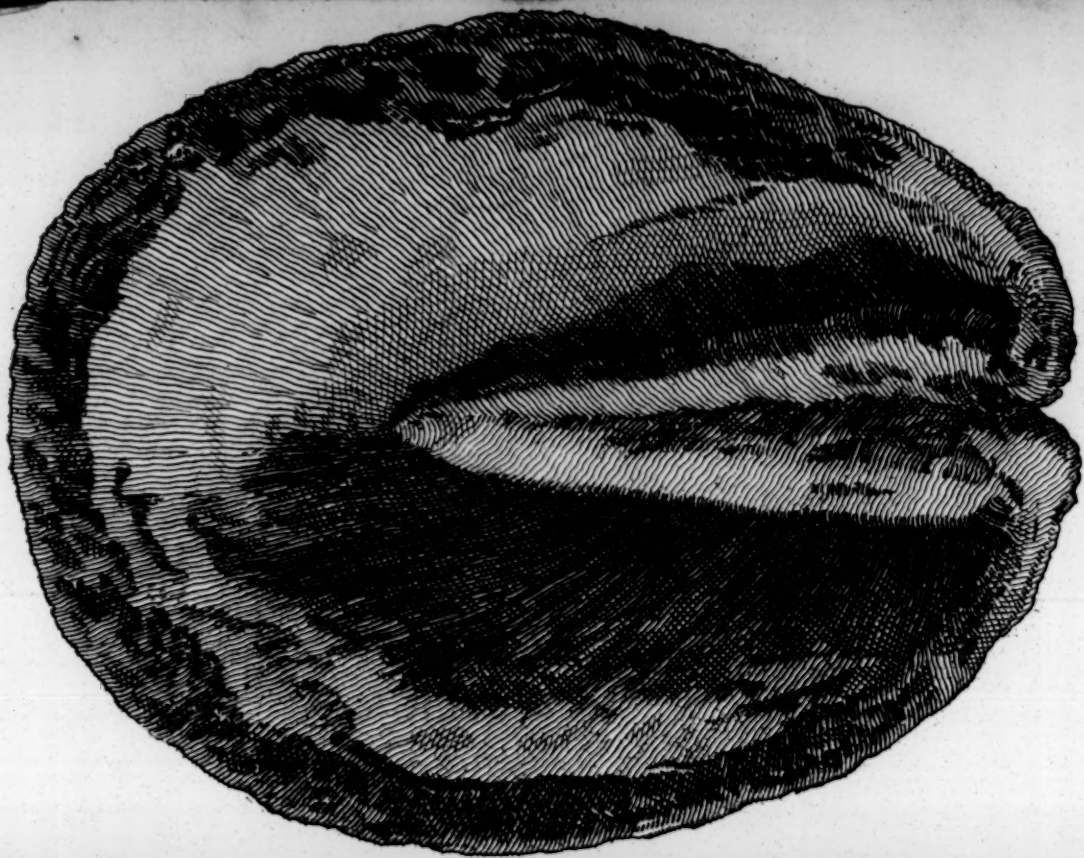


Plate . 1



Kirland Pinx. et Sculp.



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EXPLANATION
OF
THE PLATES.

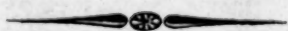


PLATE I.

FIGURE THE FIRST.

A view of the natural hoof of the Horse, being of a circular form, and shod with a short shoe.

a a a The external surface of the sole, of a concave form.

b b The inferior edge of the crust at the heels.

c c The junction of the bars with the crust.

d d The points of the bars.

e e The sole between the heels of the crust and bars, the seat of corn.

f f The heels of the short shoe not allowed to reach the seat of corn at *e e*.

g The toe of the frog.

h h The heels of the frog.

l l The cleft between the heels of the frog, the external seat of thrushes.

k k Two cavities between the sides of the bars, and the sides of the frog.

FIGURE THE SECOND.

A view of the hoof, with contracted heels, produced by the common method of shoeing.

a a a The sole.

b b The original seat of the bars.

c c The seat of the original cavities, between the bars and crust, but now, from contraction, solid horn.

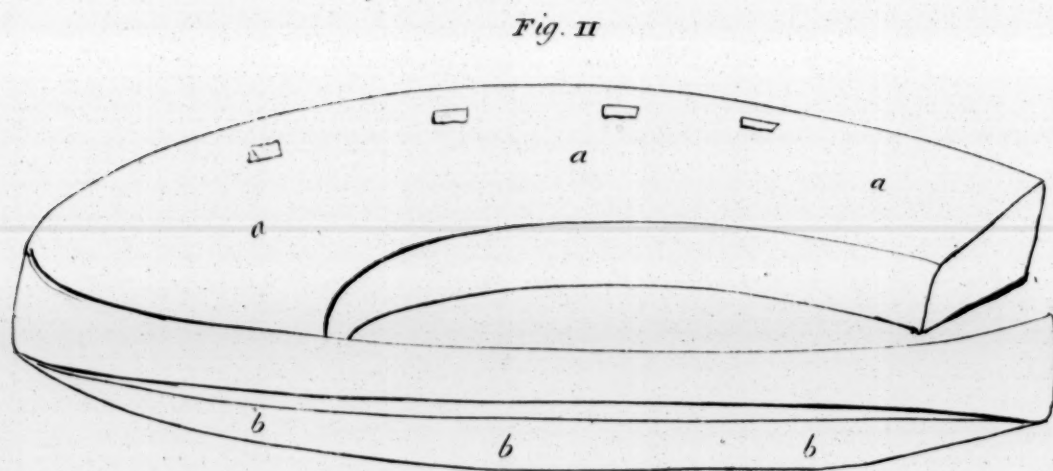
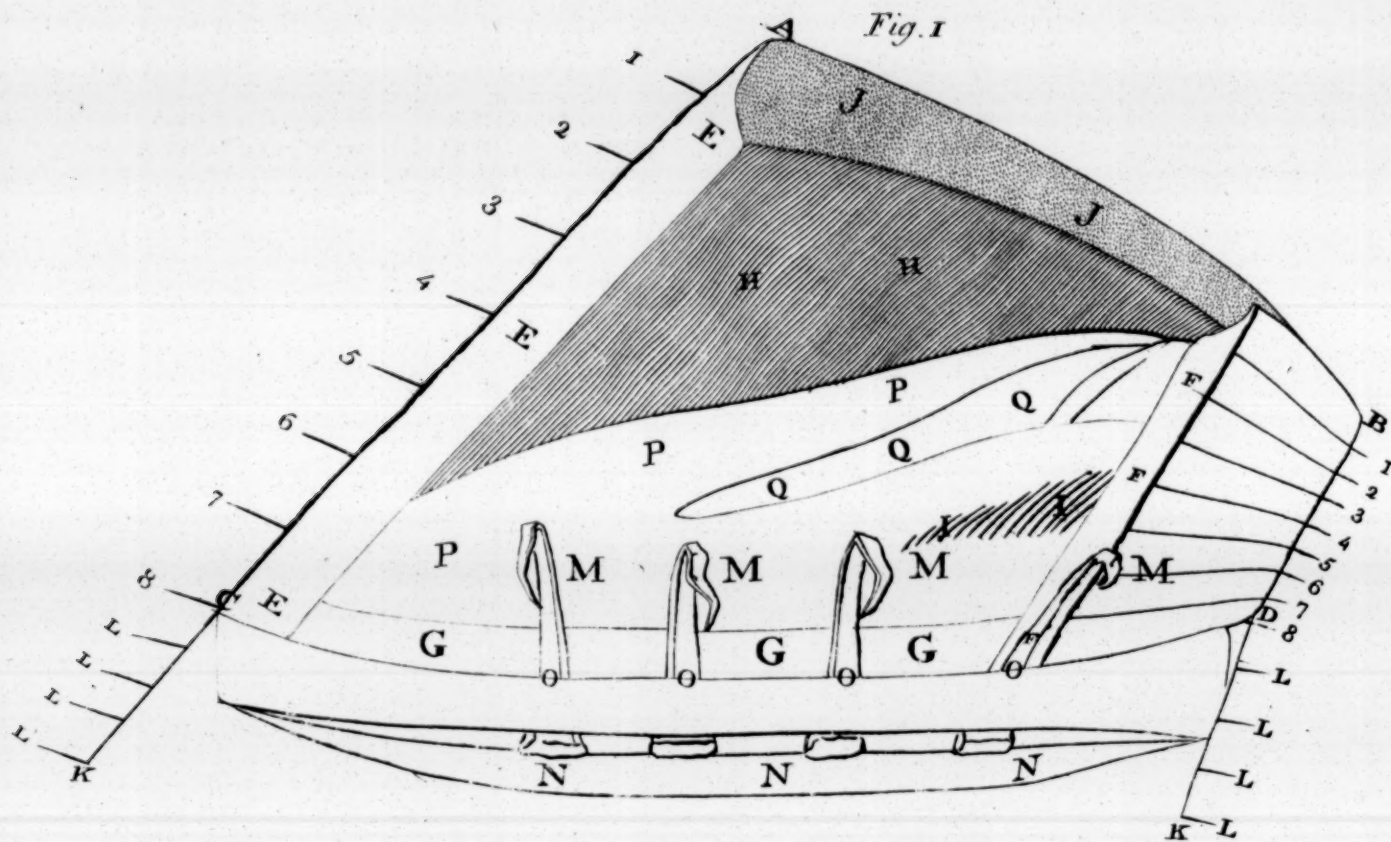
d d The frog very much compressed by the contraction of the heels of the crust.

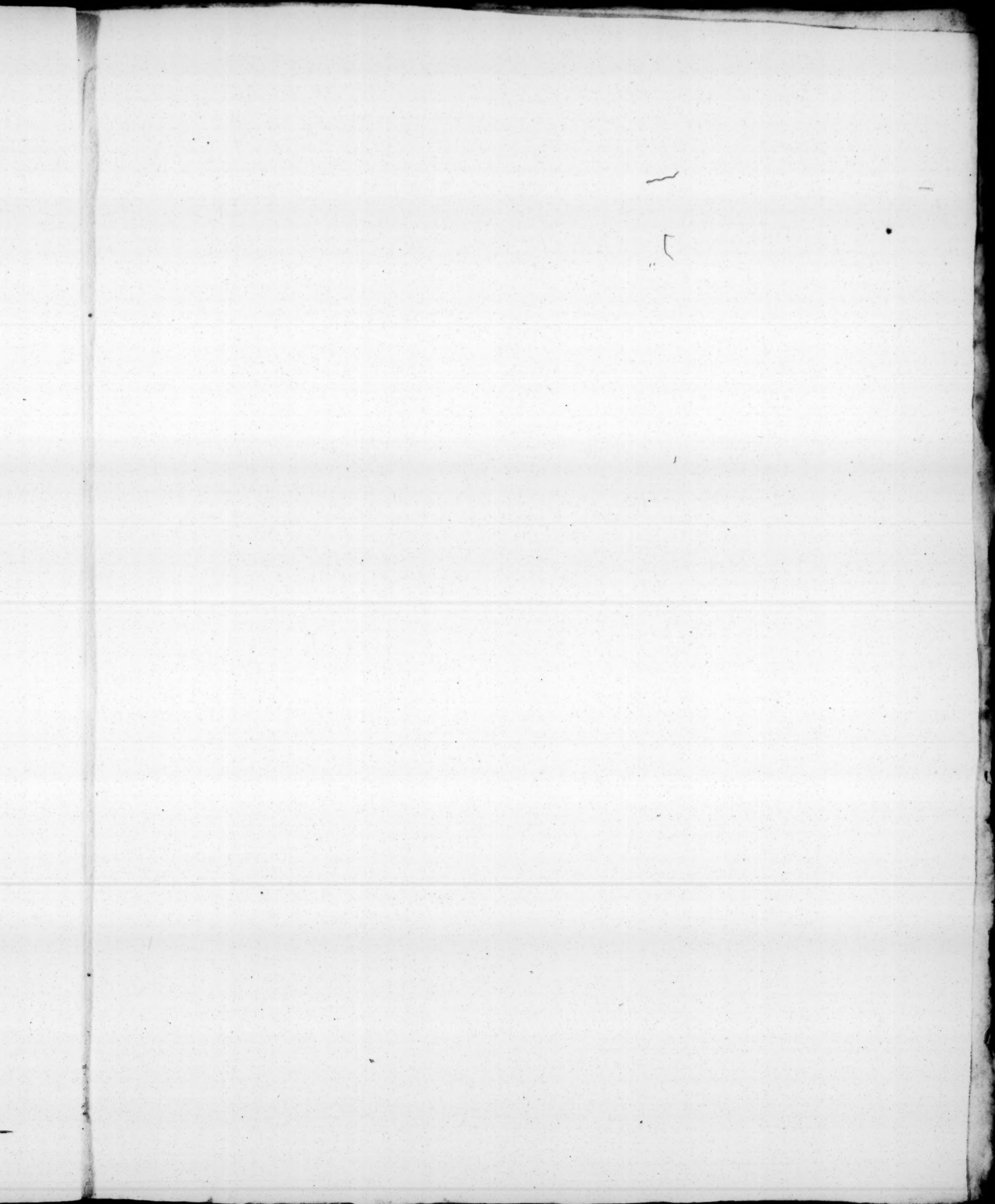
e e The width of the hoof at the heels, not being more than one-half of its length from *f* to *g*.

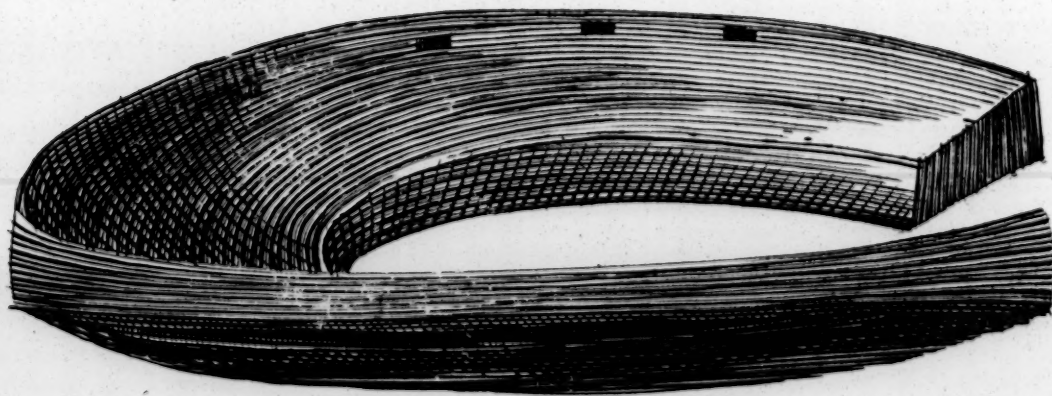
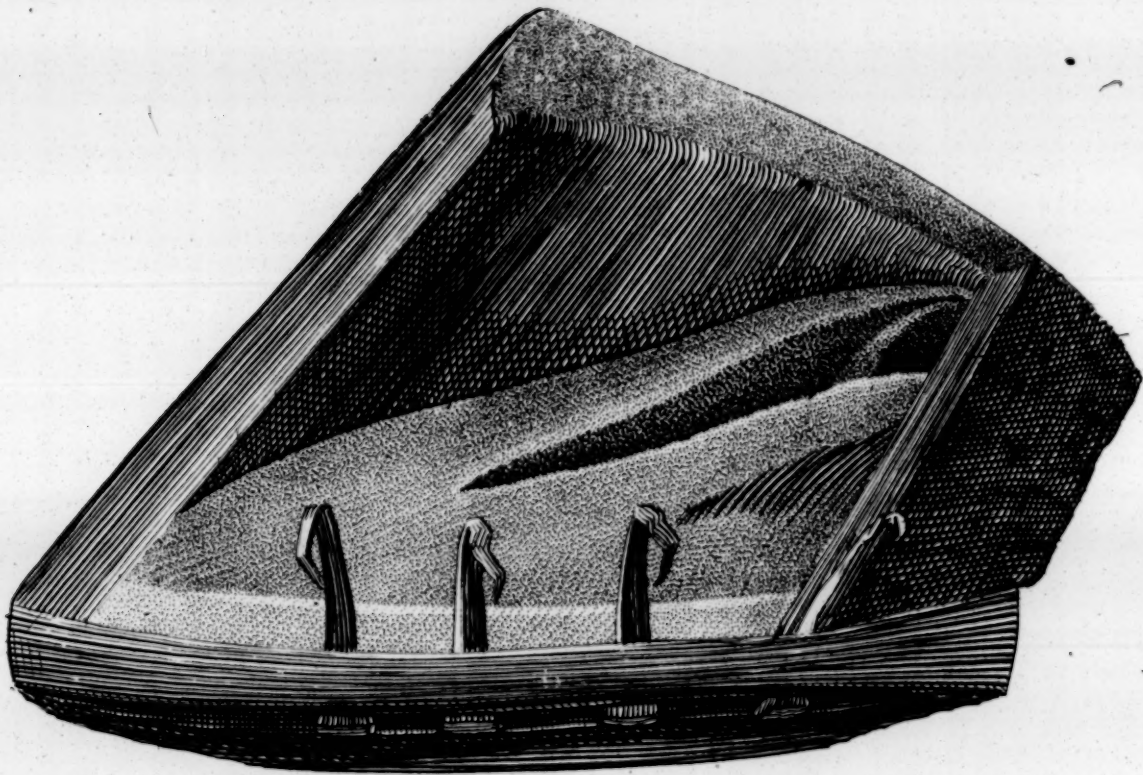
f The extremity of the heels of the frog.

g The toe of the crust.

Plate II







Enthouat Pinx. et Sculp.

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PLATE II.

FIGURE THE FIRST.

A side view of a hoof, shod with the common convex shoe, and a section of the crust, to demonstrate its relative thickness at the toe and quarters, with a lateral and interior view of the sole, and the laminæ of the crust and bars.

A B C D Two oblique lines drawn from the coronet, to shew that the crust is of a conical form.

A B The apex, c d the basis of the cone.

1 2 3 4 5 6 7 8 Transverse lines to mark the increase of the cone as the crust descends from the coronet, the last line being about one-third wider than the first.

E E E The thickness of the crust of the fore hoof, from the coronet to the toe, the middle portion of the crust between the toe and quarters, being removed.

F F F The thickness of the crust, at the inner quarter, not being more than two-thirds the substance of the crust at the toe.

G G G The lateral edge of the sole, where it unites with the crust.

H H A side view of the horny laminæ lining the crust.

I I The termination of these laminæ, attached to the internal surface of the horny sole, to form the internal part of the insensible bars.

R 2

J J

J J The coronary cavity.

K K A continuation of the two oblique lines, to mark the future descent of the crust from the coronet.

L L L L Four transverse lines on each side, to shew that as the crust descends from the figure 8, that it should become wider from side to side, as well as longer from the heels to the toe.

M M M M Four nails in the inner quarter of the crust, opposed to four other nails in the outer quarter; to shew their influence as high as the clinches, in preventing the expansion of the crust from side to side.

N N N The convex surface of the shoe opposite the ground.

O O O O The concave surface nailed to the crust, that co-operates with the nails to prevent the natural expansion of the heels in width, and compels the hoof to increase in length from the heels to the toe, in proportion as the quarters are made to contract.

P P P P The internal surface of the sole, of a convex form.

Q Q Q The internal surface of the frog.

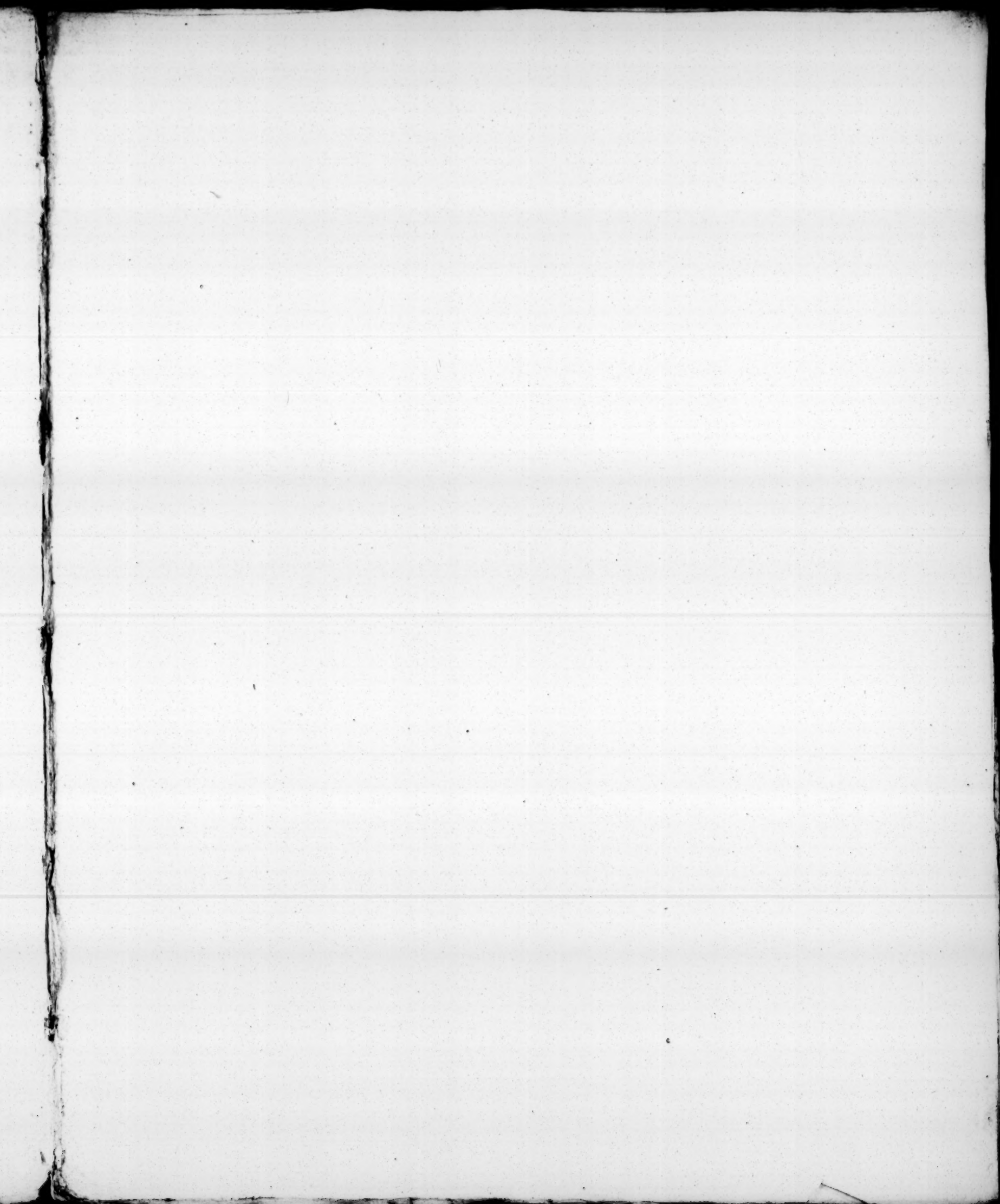
FIGURE THE SECOND.

The common shoe removed from the hoof, to shew its internal surface to be concave, and the external surface to be convex.

a a a The internal surface of the shoe, opposite the sole.

b b b The convex surface, in contact with the ground.

PLATE



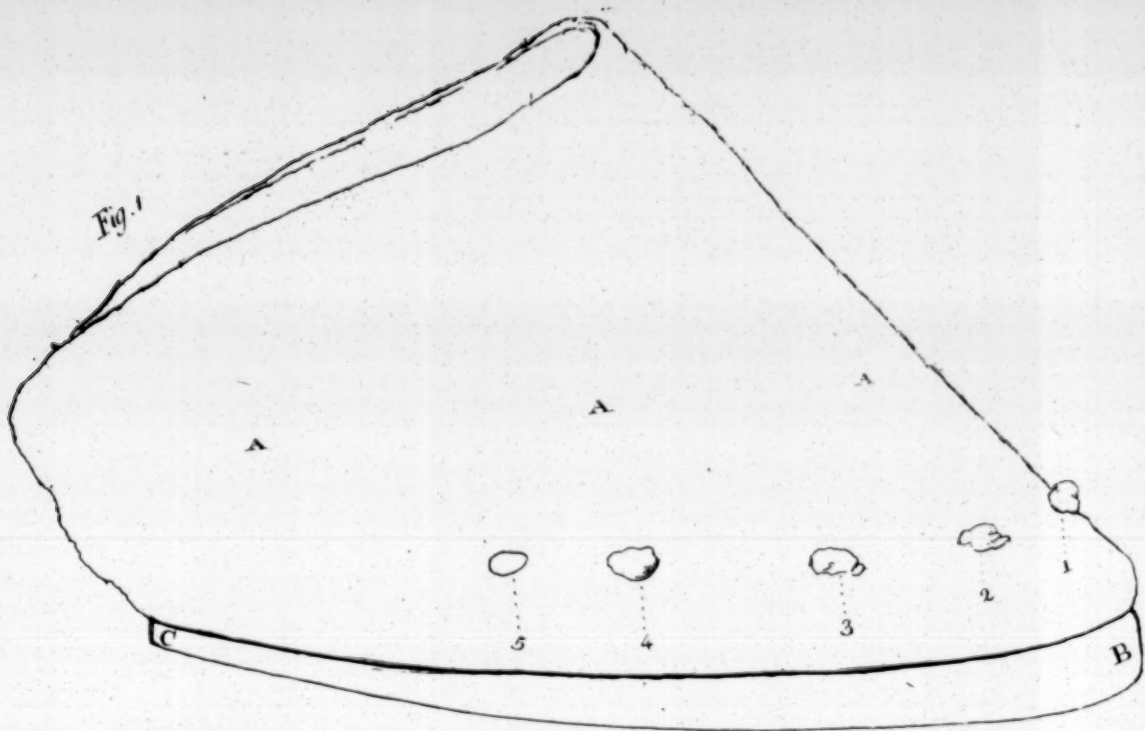
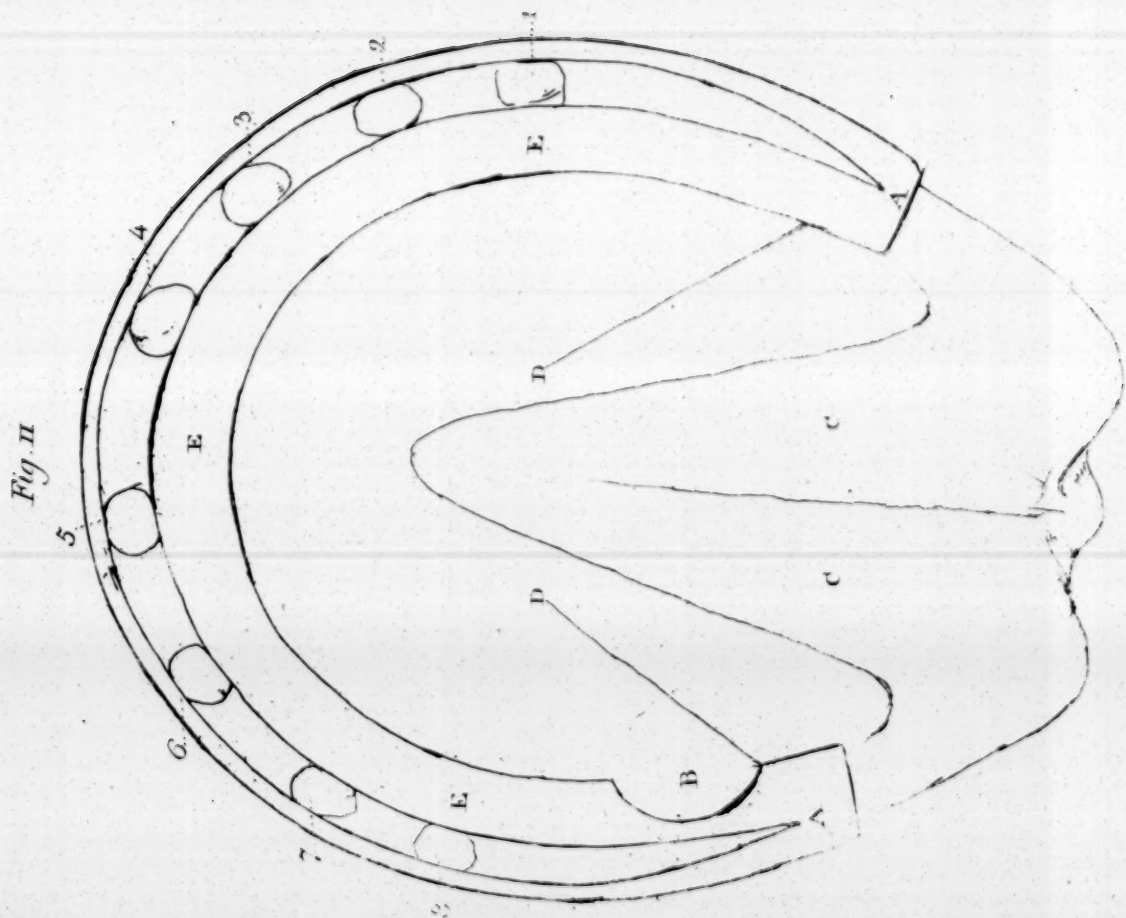


Plate III



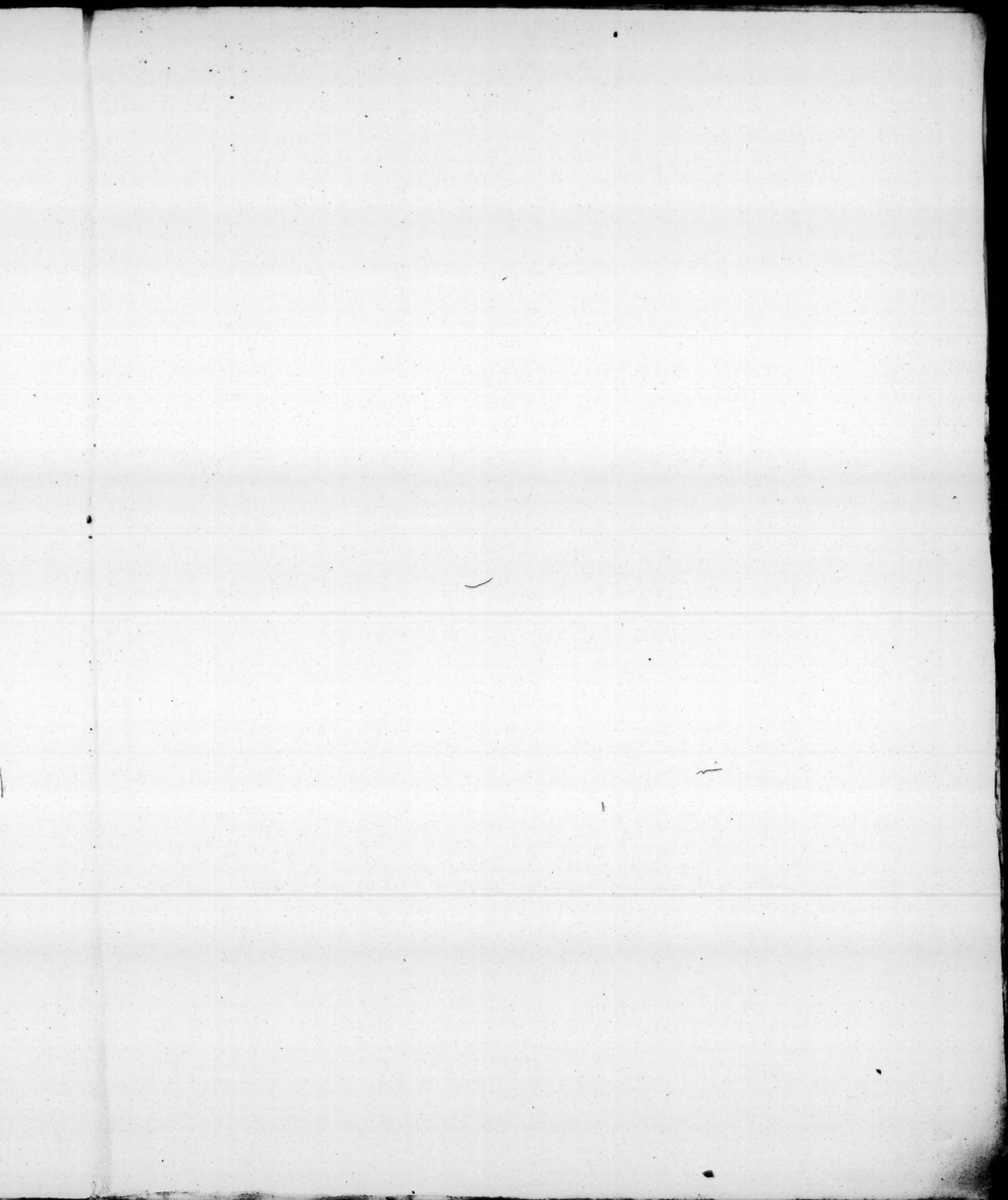


Plate III

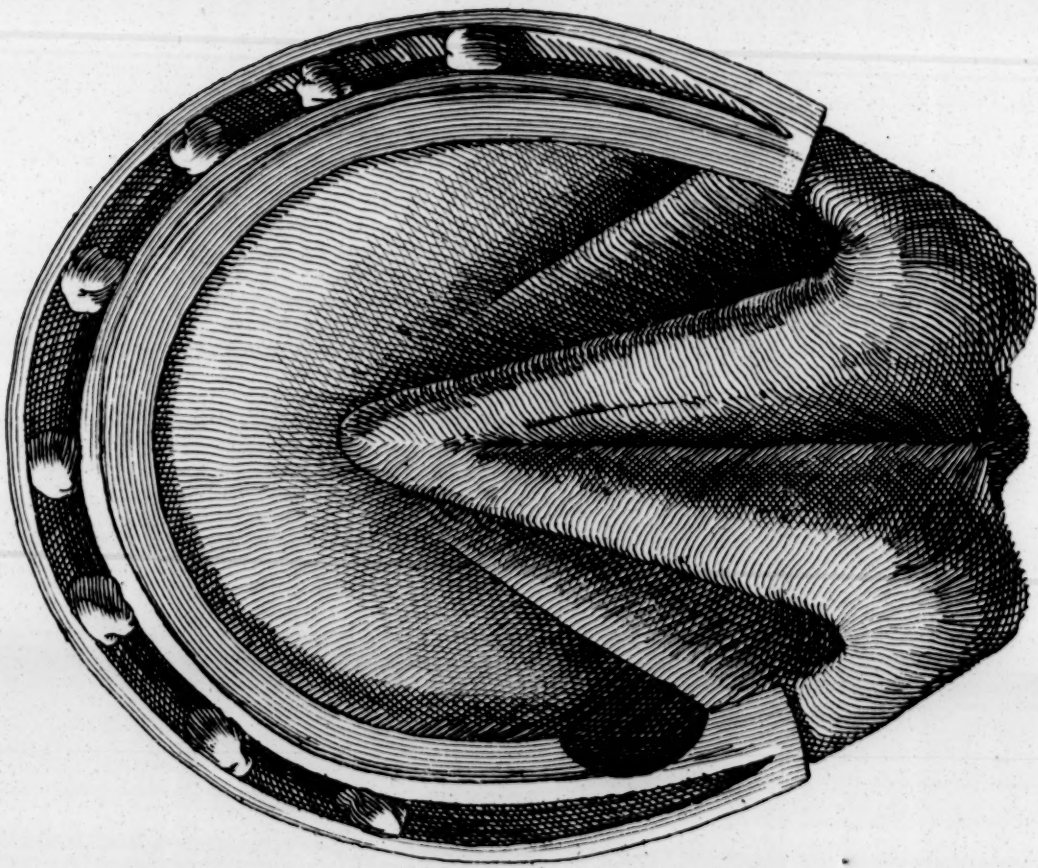
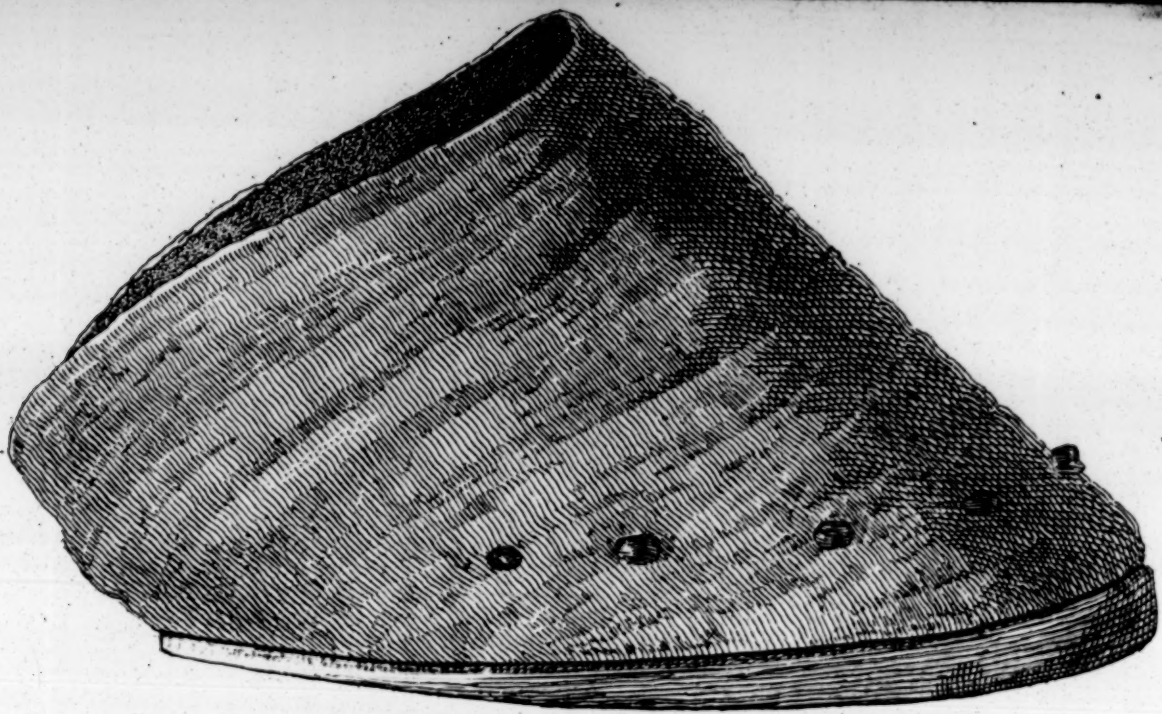


PLATE III.

FIGURE THE FIRST.

A side view of the hoof, shod with a long shoe.

AAA The hoof.

B The toe of the shoe.

C The heel of the shoe, only one-third the thickness of the toe, and made gradually tapering from B.

1 2 3 4 5 The clinches of the nails placed in the outside quarter and toe of the crust.

FIGURE THE SECOND.

An inferior view of the shoe, to shew the web to be concave externally, with the nails in the crust all round the toe, and part of the shoe removed opposite the seat of corn.

AA The heels of the shoe made flat on the upper surface, to rest on the solid basis of the junction of the bars with the crust, and thin, for the purpose of being on a parallel line with the frog.

B The seat of corn made concave with a drawing knife, and part of the shoe removed, to shew this convexity.

CC The heels of the frog equally prominent with the heels of the shoe.

DD The points of the bars.

1 2 3 4 5 6 7 8 The eight nails.

EEE The external surface of the web of the shoe made concave opposite the ground.

PLATE

PLATE IV.

FIGURE THE FIRST.

A front view of the internal cavity of the hoof, and shod for hunting, or for ice.

- A A A The porous concavity at the superior part of the hoof, above the laminae, for the reception of the convex vascular ring of the foot: the dots intended to express small holes for the termination of the blood vessels.
- B B B An interior view of the horny laminae lining the crust, attached, when living, to corresponding laminae covering the last bone of the foot, to perform the function of springs, and support the weight of the animal.
- C The middle of the internal part of the horny frog, of a convex figure, to be received into the middle of the cavity of the sensible frog, to prevent dislocation of those organs.
- D The outside heel of the shoe turned up.
- E The inside heel of the shoe not turned up, and yet parallel with the outside heel, from the horn being removed on the outside (*d*), and not touched on the inside (*e*).

FIGURE

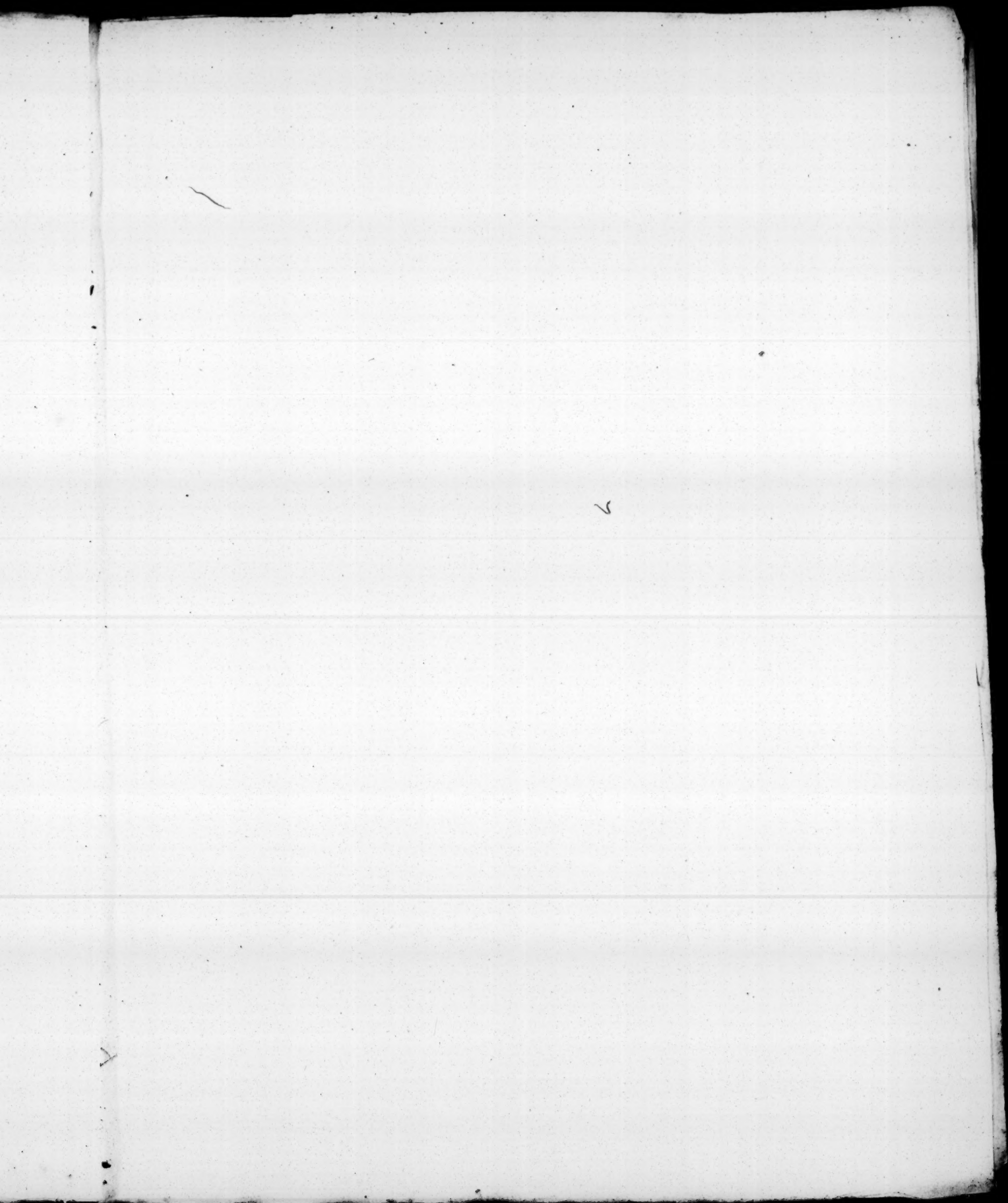


Fig I

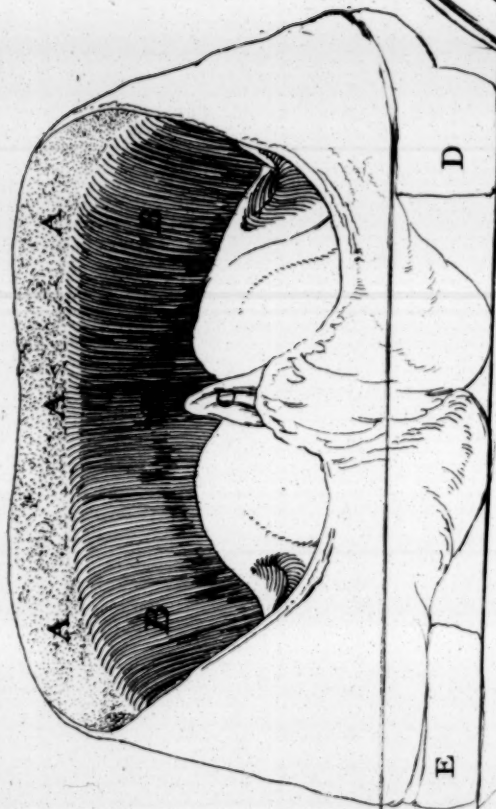


Fig II

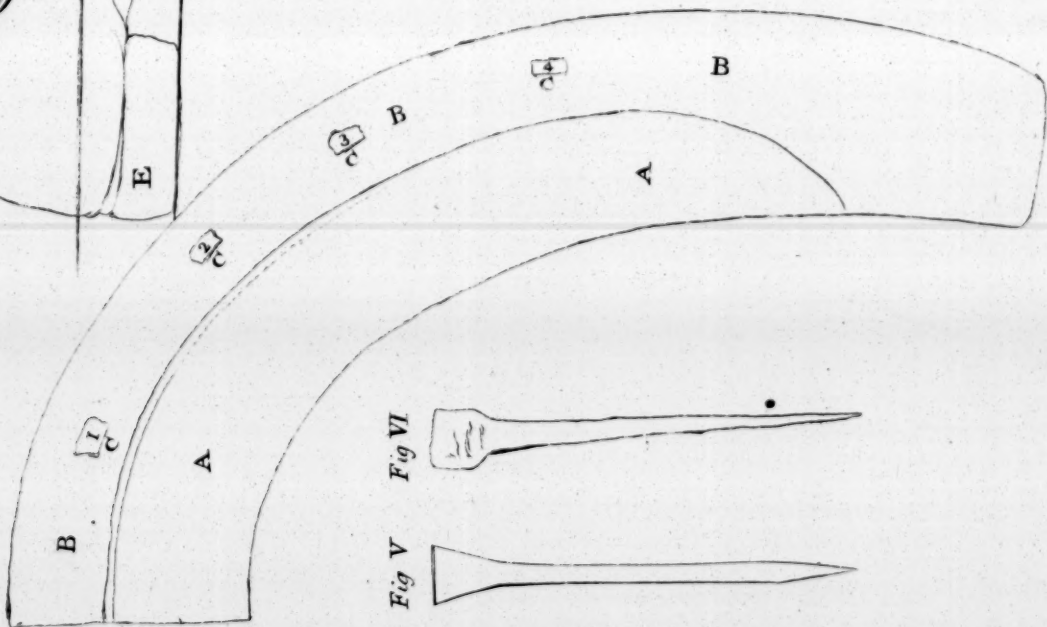


Fig V

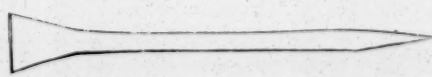


Fig VI



Fig III

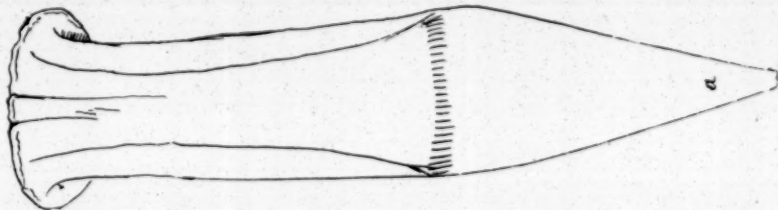
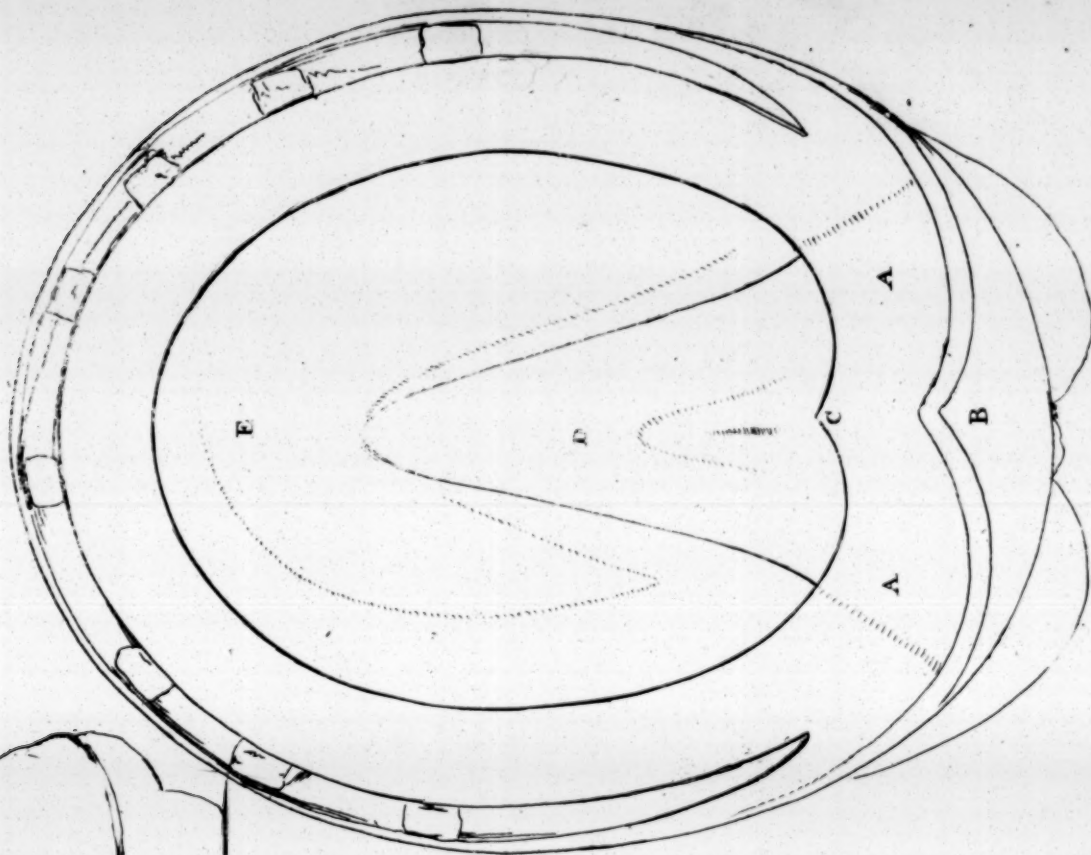
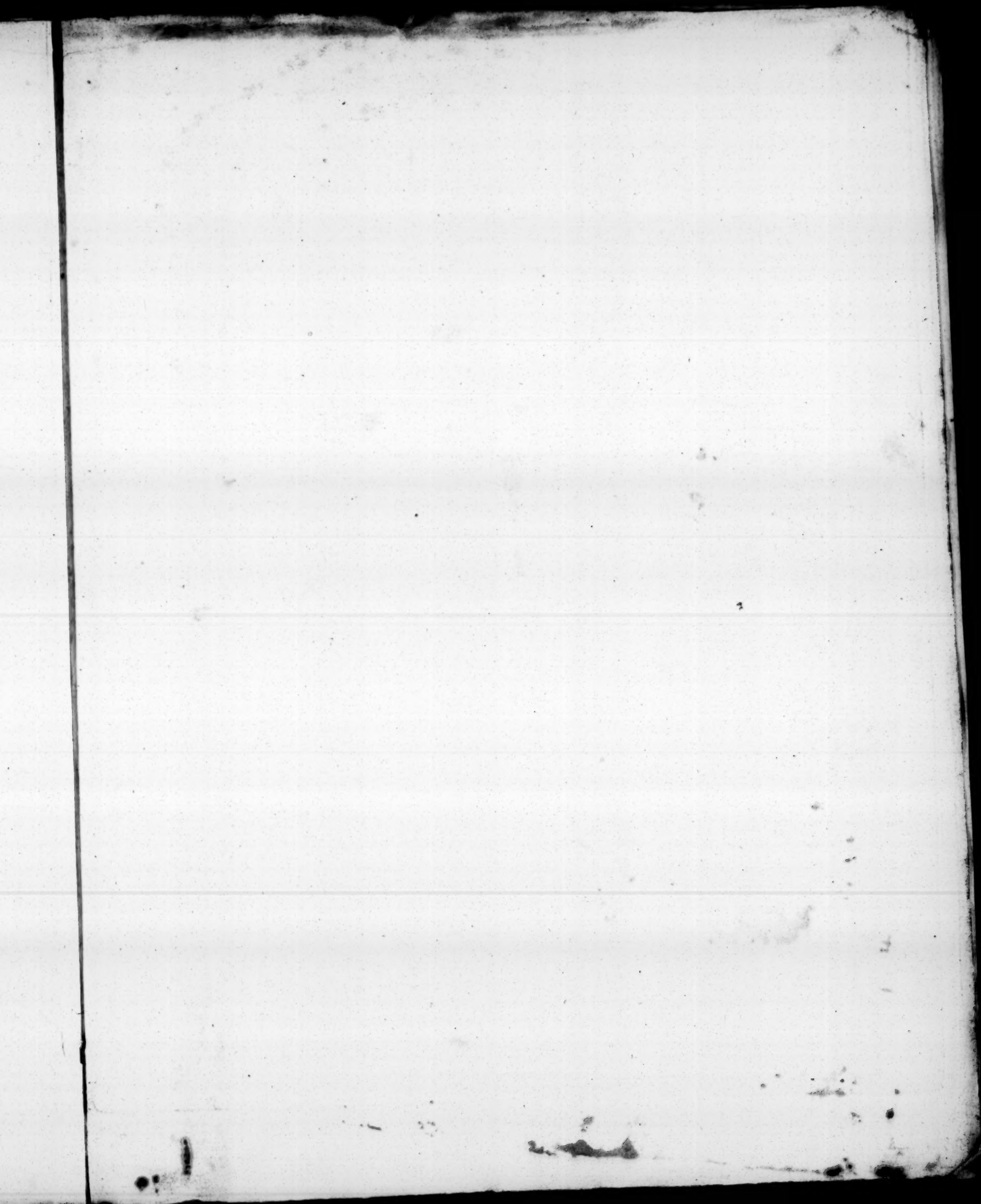


Fig III





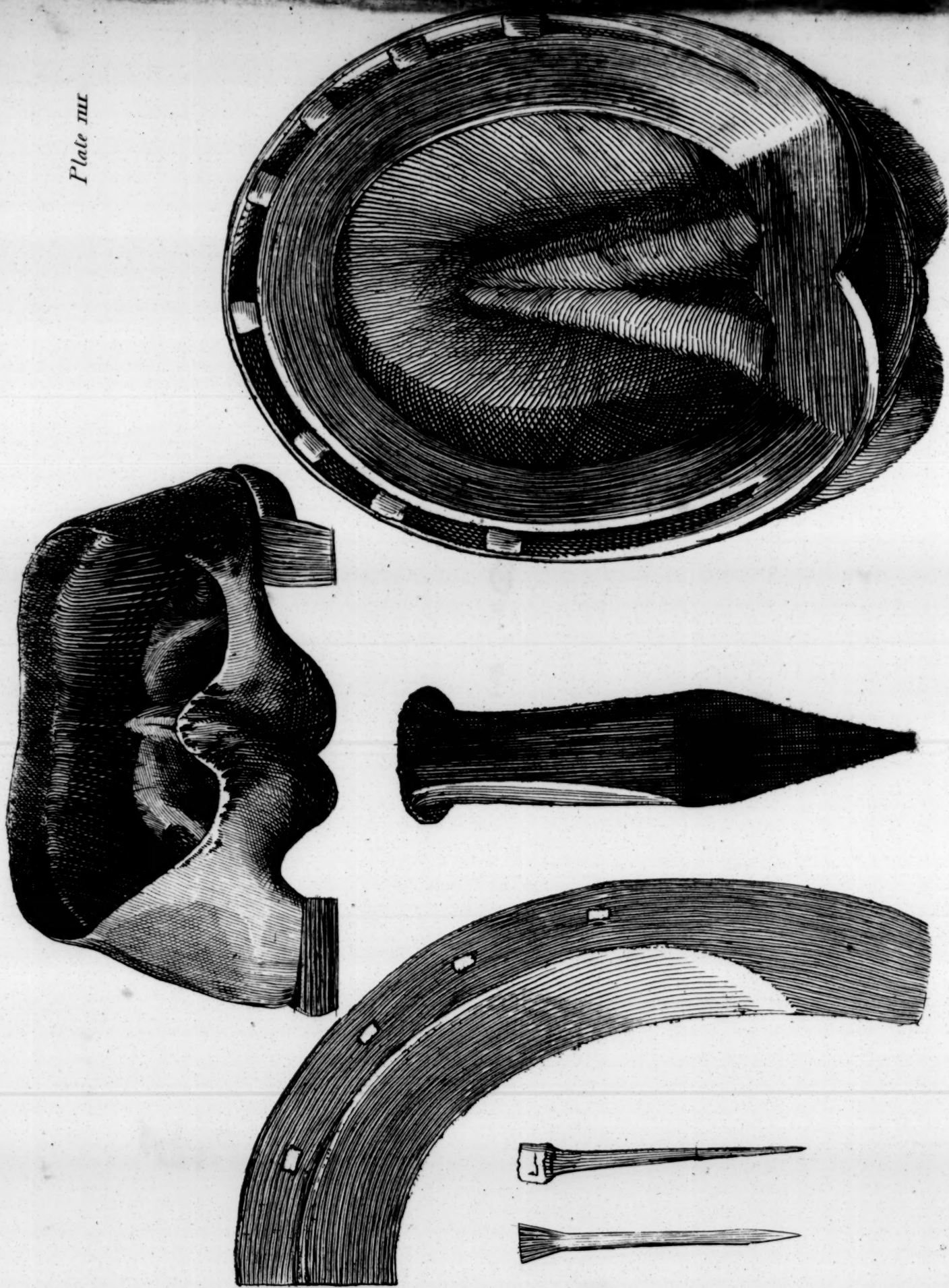


FIGURE THE SECOND.

A view of the inner surface of a shoe, that has a flat seat for the crust, and the web concave for the sole.

A A The concave part of the shoe, to be placed opposite the sole.

B B B The flat seat of the shoe, intended to be in contact only with the crust, but made of the same breadth at the inside and outside quarters, as at the toe, and much broader at every part than the substance of crust of most hoofs; and consequently this seat must be opposite the sole in every case where the breadth of crust is less than the seat.

1 2 3 4 The nail holes in the quarters of the shoe.

C C C C The flat portion of the seat, that is frequently opposite, and presses on the edge of the sole, at its junction with the crust.

FIGURE THE THIRD.

A hoof shod with a bar shoe.

A A The bar of the shoe resting on the frog.

B The back part of the shoe turned up as a stop.

C The anterior part of the bar received into the fissure of the frog.

D The frog.

E The sole.

FIGURE

FIGURE THE FOURTH.

A punch, with a wedge point, to make the nail holes.

A The part that enters the shoe.

FIGURE THE FIFTH.

A nail, with a wedge head of the same form as the point of the stamp.

FIGURE THE SIXTH.

A nail with a common head.

